FOOD MANUFACTURE

...NARD HILL LIMITED, 17 STRATFORD PLACE, LONDON, W.1. JANUARY 1, 1952

...FORNIA
...9 1952
STATE LIBRARY

Buttabelle

Here presented in full colour is the fair dairymaid who serves as the trade mark for "Buttabelle"—the perfect butter flavour. Renowned for its purity and true taste, Buttabelle is an invaluable ingredient for use in the making of every kind of confection.

BUSH

ESSENCE DISTILLERS SINCE 1851

BUSH

W. J. BUSH & CO. LTD., LONDON, E.8., ENGLAND.

FORMICA
REGISTERED TRADE MARK

TOPS EVERYTHING

As a food preparation surface, Formica is supreme. Every one of its exceptional qualities makes it the ideal—and economical—surfacing material for preparing tables, benches, storage shelves and chute runways.

HYGIENIC—Formica has a hard, smooth surface that cannot hold dust or germs. Easily cleaned with a damp cloth.

IMPERVIOUS TO—normal acids and alkalies, alcohol and all foods.

WEAR RESISTANT—Formica withstands abrasion and heavy impact, does not crack or craze.

HEAT RESISTANT—unaffected by temperatures up to 120°C.

ECONOMICAL—Formica needs little maintenance, never needs renewal. Its first cost is the last cost.

For full information about FORMICA please write to:—

Thomas De La Rue & Co. Ltd.

(PLASTICS DIVISION) IMPERIAL HOUSE

84/86 Regent Street, London, W.1.

"Formica" is a registered trade mark and De La Rue the sole registered users.

BROWN *ElectroniK*

"continuous balance"

POTENTIOMETER

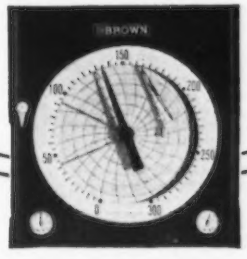
GIVES ADVANCED TEMPERATURE INDICATION, RECORDING & CONTROL

OVER 50,000 INSTALLATIONS THROUGHOUT THE WORLD

Brown "ElectroniK" Potentiometer pyrometers, by replacing conventional galvanometer and cyclic balance mechanisms with a simple self-contained electronic amplifier assembly, provide continuous measurement and high sensitivity. Simplicity and ruggedness of construction permit great reduction in maintenance costs and reduce "time off-process" to a minimum. Please write for specification bulletins. CONTROL On-off, proportional and integral action available for either electric or air operation. Derivative action also available with air operation.

HONEYWELL-BROWN LIMITED, 1 Wadsworth Road, Perivale, Greenford, Middlesex. *Works and Scottish Sales Office: Blantyre, Lanark, Scotland. Affiliated Companies: Amsterdam, Brussels, Paris, Stockholm, Zurich.*

Brown "ElectroniK"
Single or Multi-point Precision Indicator. Self-Balancing with integrally mounted push-button switches



Brown "ElectroniK"
Circular Chart Potentiometer Recorder Controller

Brown "ElectroniK"
Single or Multi-point Strip Chart Potentiometer

BRITISH MADE
Patent Specification 436,098

HONEYWELL-BROWN

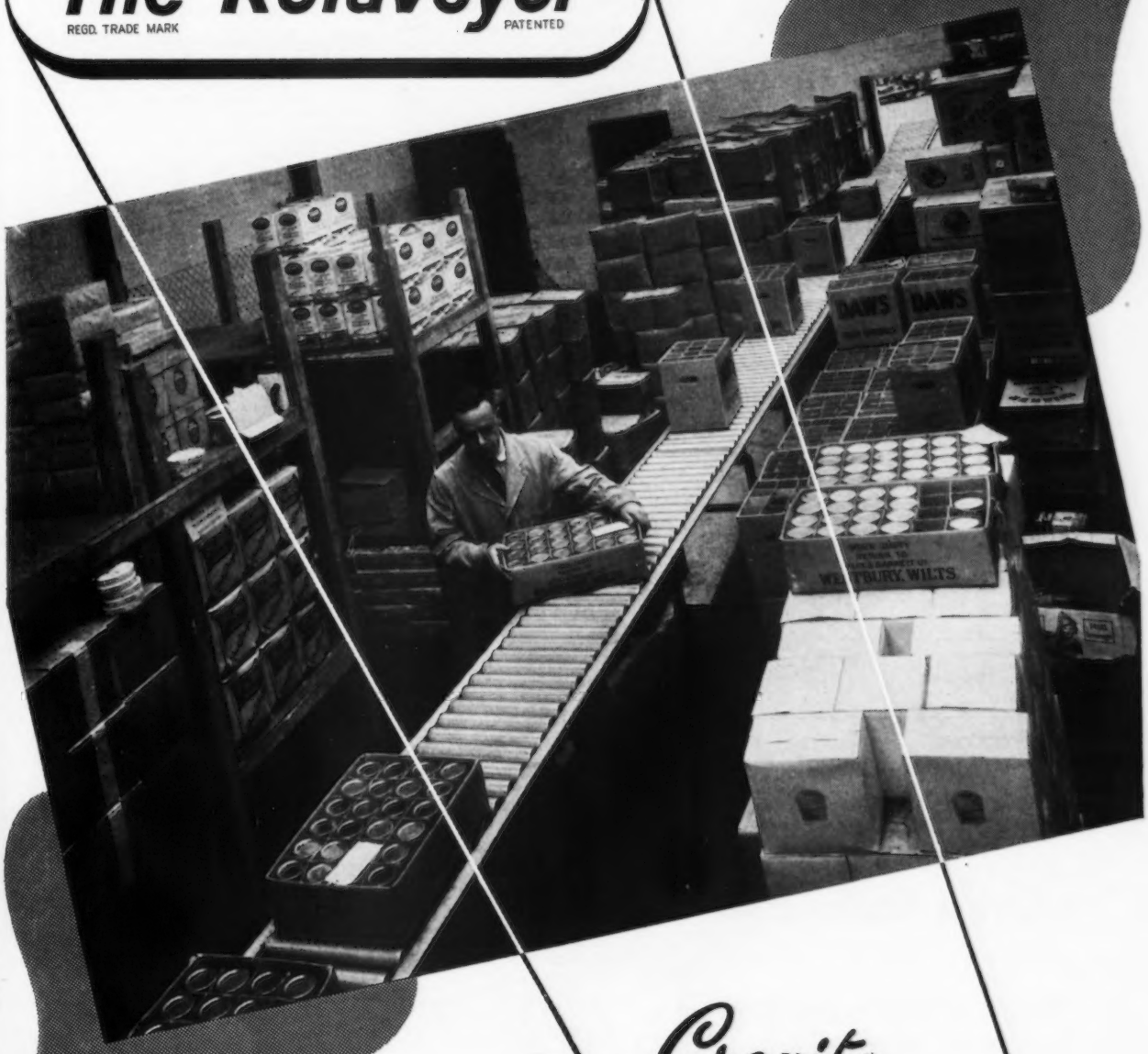
ADVANCED INSTRUMENTATION

Index to ADVERTISERS

	Page
Adams, Alfred, & Co., Ltd.	xv
Advita, Ltd.	ci
Aerograph Co., Ltd.	Dec.
Agricultural & Chemical Products, Ltd.	cv
Albro Fillers & Engg. Co., Ltd.	Dec.
Alfa Laval Co., Ltd.	lii
Alginate Industries, Ltd.	lii
Allam, E. P., & Co., Ltd.	April
Allen, Stafford, & Sons, Ltd.	xlviii
Andrews Bros. (Bristol.), Ltd.	June
A.P.V. Co., Ltd.	xxxix
Arabol Mnfg. Co., Ltd.	Nov.
Associated Metal Works, Ltd.	cviii
Ateliers de Constructions Electriques de Charleroi	Sept.
Attwood, A. L., & Co., Ltd.	Dec.
Automatic Weighing & Packing Machine Co.	Dec.
B.A.S. Overseas Publications	June
Bakers' & Confectioners' Exhibition	April
Baldwin Instrument Co., Ltd.	xcvi
Bamag, Ltd.	Dec.
Barker-Bland Engg. Co., Ltd.	xciv
Barnet Trading Co.	xc
Barron, W. S., & Son, Ltd.	Dec.
Bastian & Allen, Ltd.	Dec.
Bear Honey Co., Ltd.	Dec.
Beddington Nut & Produce Co.	cvi
Begg, Cousland & Co., Ltd.	Dec.
Bellingham & Stanley, Ltd.	xciv
Benjamin Electric Ltd.	May
Bennett Sons & Shears, Ltd.	Nov.
Bertrams Ltd.	Oct.
Birmingham Chemical Co.	Dec.
Blick Time Recorders Ltd.	Oct.
Bliss, E. W. (England), Ltd.	xli
Boabands, Ltd.	April
Boehm, Frederick, Ltd.	xxix
Bollans, R. W., & Co., Ltd.	Dec.
Bonniksen & Cronk, Ltd.	June
Bowaters Fibre Containers, Ltd.	xxvii
Braby, Fredk., & Co., Ltd.	lxxvi
Bradley & Burch, Ltd.	May
Bramigk & Co., Ltd.	Dec.
Brewers' Food Supply Co., Ltd.	Dec.
Bridges, S. N., & Co., Ltd.	xxxvii
Brierley, Wm. Collier & Hartley, Ltd.	ci
Bright, John, & Bros., Ltd.	lxx
Brightside Foundry & Engg. Co., Ltd.	lxxi
Bristol's Instrument Co., Ltd.	May
Britannia Folding Box Co., Ltd.	cviii
British Electrical Development Association	xvi
British Fermentation Products, Ltd.	xciii
British Food Fair	Oct.
British Hydrological Corporation	xci
British Industries Fair	Aug.
British Jeffrey-Diamond, Ltd.	lxxviii
British Railways	Nov.
British Ratin Co., Ltd.	viii
British "Rema" Mnfg. Co., Ltd.	Mar.
British Thomson-Houston Co. (Mazda)	lxvii
British Thomson-Houston Co. (Rugby)	Dec.
British Wedge Wire Co., Ltd.	lxi
Broadbent, Thomas, & Sons, Ltd.	xlii
Brookhirst Switchgear, Ltd.	Dec.
Brown & Forth, Ltd.	Sept.
Bryan, Wm., Ltd.	lx
Bulmer, H. P., & Co., Ltd.	xliii
Burnett & Rolfe, Ltd.	Dec.
Bush, W. J., & Co., Ltd.	Cover i
Butterfield, W. P., Ltd.	Dec.
Caleb Duckworth, Ltd.	Dec.
Calfos, Ltd.	vii
Cambitzi, G., & Co., Ltd.	lviii
Cambridge Instrument Co., Ltd.	Oct.
Canning Town Glass Works, Ltd.	xc
Carr & Co.	Dec.
Chamberlain & Willows	c
Cherry-Burrell, Ltd.	vi
Cinema-Television, Ltd.	xx
Clares Service	xcvi
Clark, George, & Co., Ltd.	Dec.
Clark, T. & C., & Co., Ltd.	Dec.
Coates Bros., Ltd.	xiii
Cohen, George, Sons & Co., Ltd.	xi, cvi
Collis, J., & Sons, Ltd.	v
Commer Cars, Ltd.	xxxi
Commercial Equipment Co. (London), Ltd.	Oct.
Conserves-Teknik	May
Container Recovery Service	xii
Conway Jackson & Co., Ltd.	cii
Cooper, McDougall & Robertson, Ltd.	Sept.
Creamery Package Mnfg. Co., Ltd.	lxxx
Croda, Ltd.	lxiv, xcvii
Crofts (Engineers), Ltd.	lxxxvi
Crompton Parkinson, Ltd.	May
Cumming, Parsons, Ltd.	ciii
Cyclo Chemicals, Ltd.	Oct.
Dale, John, Ltd.	Dec.
Daniel, H. E., Ltd.	xcv
Daniels, S., & Co., Ltd.	Dec.
Danks, Edwin & Co., Ltd.	Dec.
Dapag (1943) Ltd.	lxxxii
Davidson, C., & Sons, Ltd.	Dec.
Davis Gelatine, Ltd.	Aug.
Dawson Bros., Ltd.	lix
De La Rue, Thomas, & Co., Ltd.	Cover ii
Dewey & Almy, Ltd.	Dec.
Dexion, Ltd.	April
Distillers Co., Ltd.	cviii
Dixon, R. G. & Co., Ltd.	May
Dodge Brothers (Britain), Ltd.	Nov.
Douglas, Chas. E., Ltd.	Dec.
Dowson & Mason Gas Plant Co., Ltd.	Dec.
Drayton Regulator & Instrument Co.	Nov.
Drysdale & Co., Ltd.	Dec.
Duche, T. M., & Son, Ltd.	cvii
Dunford & Elliott, Ltd.	Feb.
Eastern Wool Growers, Ltd.	civ
Edme, Ltd.	Feb.
Edwards, F. J., Ltd.	Sept.
Electric Construction Co., Ltd.	Sept.
Electrical Contractors Association	Dec.
Electropower Gears, Ltd.	xcii
Ellison, George, Ltd.	x
Enamelled Metal Products Corp. (1933)	Nov.
English Electric Co., Ltd.	Nov.
English Grains Co., Ltd.	Dec.
Essex Aero, Ltd.	Aug.
Eva, Alfred, & Son, Ltd.	Dec.
Evan Cook's	Dec.
Evans Electroselenium, Ltd.	Oct.
Evans, Norman & Rais, Ltd.	Aug.
Evans, Wm., & Co., Ltd.	xlvi
Evershed & Vignoles, Ltd.	xvii
Fairfax Eng. Co., Ltd.	xcvi
Famor Food Products	Dec.
Feaver, John, Ltd.	Dec.
Feculose Co., Ltd.	Dec.
Fenner, J. H., & Co., Ltd.	xcii
Fisher's Foils, Ltd.	Dec.
Fison, Edward, Ltd.	xxii
Flexile Metal Co., Ltd.	Oct.
Flextol Engg. Co., Ltd.	May
Ford Motor Co., Ltd.	Nov.
Foster, Yates & Thom, Ltd.	June
Fox, Samuel, & Co., Ltd.	Dec.
Fraser, J., & Son, Ltd.	xcviii
Frischmann, H.	xcviii
Fuller, Horsey, Sons & Cassell	cii
Funditor, Ltd.	xcvii
Gale & Mount, Ltd.	Dec.
Gallenkamp, A., & Co., Ltd.	July
Gardner, Wm., & Sons (Glos.), Ltd.	Oct.
Gas Council	xxxiv
Gascoigne, Geo. H., Co., Ltd.	Sept.
G.C. Engineering Co., Ltd.	Dec.
Gee Manufacturing Co., Ltd.	Dec.
General Electric Co., Ltd.	xxxiii
General Sales (Ireland), Ltd.	liv
Giusti, T., & Son	Dec.
Glazebrooks, Ltd.	lxxxvi
Gloy & Empire Adhesives, Ltd.	cii
Glynn Co., Ltd., The	Dec.
Gosheron, John, & Co., Ltd.	lxvi
Graham & Gillies, Ltd.	lxxxiii
Gresham & Craven, Ltd.	lxviii
Grew, James, & Co., Ltd.	Dec.
Guest, Keen & Nettlefolds Ltd.	July
Hall, J. & E., Ltd.	xxxv
Hall & Lane, Ltd.	lxxxiv
Hamburger, M., & Sons	c
Harcraft & Co., Ltd.	June
Havinden, G., Ltd.	Dec.
Hawker & Co.	civ
Henlys	Dec.
Heston Aircraft Co., Ltd.	Oct.
Heywood, W. H., & Co., Ltd.	Dec.
Hilton, Wallace & Co., Ltd.	Dec.
Hiron & Rempler, Ltd.	April
Holden, Arthur, & Sons, Ltd.	xl
Holden & Brooke, Ltd.	Nov.
Honeywell-Brown, Ltd.	iii
Hopkinsons, Ltd.	liv
Horwood Trading Co., Ltd.	cvii
Howard Pneumatic Engg. Co., Ltd.	Feb.
Howards & Sons, Ltd.	lxxxix
Hunt Partners, Ltd.	Mar.
Imperial Chemical Industries, Ltd.	xxiii
Industrial Products (Speco), Ltd.	Jan.
Industrial Tapes, Ltd.	lxxxviii
International Time Recording Co., Ltd.	Aug.
J. & R. (Butchers) Supplies, Ltd.	c
Jackson, J. G., & Crockatt, Ltd.	cii
Jenkins, Robert, & Co., Ltd.	Dec.
Jenner, A. & Co., Ltd.	lxiii
Jobling, James A., & Co., Ltd.	xxviii
Johnson, A., & Co., Ltd.	Dec.
Johnson & Johnson (Great Britain), Ltd.	Dec.
Johnsons (Darley Dale), Ltd.	xc
Jones, Samuel, & Co., Ltd.	xiv
Karrier Motors Ltd.	Dec.
Kek, Ltd.	c
Kellie, R., & Son, Ltd.	xlv
Kestner's	lxxviii
Kimpton Bros., Ltd.	Dec.
King, Geo. W., Ltd.	lxxvi
Kleen-e-ze Brush Co., Ltd.	Nov.
Lacey-Hulbert & Co., Ltd.	c
Lambert, L., & Co., Ltd.	lxxiv
Lautier Fils, Ltd.	Aug.
Lax & Shaw, Ltd.	lxx
Lenderink & Co., Ltd.	l
Lewin Road Sweepers, Ltd.	lxiv
Lewis, H. K., & Co., Ltd.	cii
Llewellin, G., & Son	May
Lyric Snacks	Nov.
Machinery (Continental), Ltd.	Aug.
Magnetic Valve Co., Ltd.	lxxiv
Maitlands (Metal Works), Ltd.	Dec.
Manesty Machines, Ltd.	Dec.
Marconi Instruments, Ltd.	lxxii
Margulies Bros., Ltd.	Nov.
Mather & Platt, Ltd.	Dec.
May & Baker, Ltd.	Dec.
Medway Corrugated Paper Co., Ltd.	xxi
Medway Paper Sacks, Ltd.	Dec.
Mellish, A. W., Ltd.	xcii
Metafiltration Co., Ltd.	lxxii
Metal Box Co., Ltd.	Dec.
Metal Closures, Ltd.	Cover iii
Metal Propellers, Ltd.	Dec.
Minerval Produce Co.	xciv
Minnesota Mining & Mnfg. Co., Ltd.	xlvii
Mitchell, L. A., Ltd.	lxxxix
Mitchell Engineering, Ltd.	lxv
Mono Containers, Ltd.	Oct.
Mono Pumps, Ltd.	lxxxvii
Monsanto Chemicals, Ltd.	Dec.
Morgan Fairest, Ltd.	xliv
Morning Foods, Ltd.	Dec.
Morton Machine Co., Ltd.	Dec.
Morton, Robert, & Co., Ltd.	Dec.
Musgrave & Co., Ltd.	lx
National Adhesives, Ltd.	xxvi
National Corrugated Paper Co., Ltd.	xxv
Negretti & Zambra, Ltd.	lviii
Newalls Insulation Co., Ltd.	xxxi
Newbron Printing Co.	cii
Newman Industries, Ltd.	June
Newton Chambers & Co., Ltd. (Lithcote)	Dec.
Nipa Laboratories, Ltd.	Nov.
Norman Engg. Co.	Dec.
Northide, Ltd.	June
Nu-Swift, Ltd.	civ
Oppenheimer Casing Co. (U.K.), Ltd.	lxxxiv
Ormerod Engineers, Ltd.	lxxxviii
Osram Lamps	xxxviii
Oury, Millar & Co., Ltd.	lxxxi

The RolaVeyor

REGD. TRADE MARK PATENTED



Gravity works for nothing!

Gravity, that willing horse, can be harnessed to carry your loads by installing The RolaVeyor. The St. Ivel Sales Company, of Birmingham, have found that unloading in their grocery store is done easily and rapidly by rolling their goods on The RolaVeyor. And what's more they find they need not waste valuable storage space, so quickly is The RolaVeyor dismantled and re-erected wherever it is needed. Standard eight-foot lengths are made in Light, Medium, Heavy and Heavy Duty Types.

Write for details to Dept. C.3 J. Collis & Sons, Ltd., Regent Square, Gray's Inn Road, London, W.C.1. Tel. TER 6141.

J. Collis & Sons, Ltd.

Index to ADVERTISERS

	Page
Padley & Venables, Ltd.	Nov.
Pascall Engineering Co., Ltd.	xciv
Paterson Hughes Engg. Co., Ltd.	Dec.
Pearson Phillips, Ltd.	June
Peerless & Ericsson, Ltd.	xcv
Permutit Co., Ltd.	xlix
Philips Electrical Ltd.	Dec.
Plenty & Son, Ltd.	xcviii
Pneumatic Scale Corporation	xcix
Polak & Schwarz, Ltd.	Dec.
Poppe Rubber & Tyre Co., Ltd.	Dec.
Porteus, G., & Sons, Ltd.	Dec.
Premier Colloid Mills, Ltd.	Nov.
Premier Filterpress Co., Ltd.	Dec.
Pressed Steel Co., Ltd.	Nov.
Prodorite Ltd.	Aug.
Pulsometer Engg. Co., Ltd.	cviii
Purdy Machinery Co., Ltd.	Dec.
Quickfit & Quartz, Ltd.	lxix
Quiz Electrics, Ltd.	lvi
Rapid Magnetic Machines, Ltd.	Dec.
Rayner & Co., Ltd.	Dec.
Reads, Ltd.	Dec.
Realm Engineering Works, Ltd.	lxxxiv
Red Breast Preserving Co., Ltd.	xcix
Rhodes, Geo., W., & Son, Ltd.	May
Rhyl Amusements, Ltd.	lxxxiv
Roberts, David, & Son	Dec.
Rola, G.m.b.H.	Sept.
Rose Downs & Thompson, Ltd.	lxxiii
Royles, Ltd.	lvi
Rozalex, Ltd.	Dec.
Ryan, William, & Co.	civ
Samuelson, P., & Co., Ltd.	Nov.
Saniguard Appliances Ltd.	Nov.
Saunders Valve Co., Ltd.	xci
S.B. Engineering Co., Ltd.	Dec.
Scientific Packaging	Aug.
Scott, George, & Son, Ltd.	Oct.
Senior Economisers, Ltd.	ix
Service Electric Co., Ltd.	xcviii
S.F.P. (Food Products) Ltd.	lviii
Shell Chemicals, Ltd.	lxxv
Short & Mason, Ltd.	Nov.
Sichel Adhesives, Ltd.	civ
S.I.G. Wrapping Machines, Ltd.	cv
Silverson Machine (Sales), Ltd.	Dec.
Simon, Henry, Ltd.	Dec.
Skerman, C., & Sons, Ltd.	cvi
SMALL ADVERTISEMENTS	cv-cvii
Small Electric Motors, Ltd.	lxxxvii
Smith, T., & Co.	Nov.
Soya Foods, Ltd.	June
Spa Gelatine	Dec.
Spicer Food Company, Ltd.	Nov.
Standard Bottle Co., Ltd.	Dec.
Standard Synthetics, Ltd.	lxxxv
Starch Products, Ltd.	lxxvii
Stelcon Industrial Floors, Ltd.	lxxix
Stevenson & Howell, Ltd.	ciii
Sterne, L., & Co., Ltd.	Oct.
Stokes & Dalton, Ltd.	Nov.
Stonehouse Bros., Ltd.	lv
Sturge, J. & E., Ltd.	Dec.
Sturtevant Engineering Co., Ltd.	xciii
Surfastal, Ltd.	lxxxviii
Talbot Stead Tube Co., Ltd.	Sept.
Tan-Sad Chair Co., Ltd.	lxviii
Taylor Rustless Fittings Co., Ltd.	Dec.
Teleflex Products, Ltd.	lxvi
Tenaplas (Sales), Ltd.	Oct.
Tesco Stores, Ltd.	Nov.
Thomas, Richard, & Baldwins, Ltd.	Sept.
Thomas, W. K., & Co.	May
Thompson & Norris Mnfg. Co. Ltd.	li
Tintometer, Ltd., The	xc
Trapinex, Ltd.	lvii
Trapow, D., & Co., Ltd.	xviii
Tyne Truck & Trolley Co., Ltd.	Dec.
U.D. Engg. Co., Ltd.	Nov.
Union Food Machinery & Equipment, Ltd.	Dec.
Unipectin, Ltd.	civ
United Glass Bottle Mnfrs., Ltd.	xxiv, Cover iv
United Indigo & Chemical Co., Ltd.	xxxii
United Steel Companies, Ltd.	Dec.
Universal Conveyor Co., Ltd.	May
Universal Metal Products, Ltd.	Oct.
Usines Vermylen	May
Valley Products (Lyle), Ltd.	Aug.
Vickers-Armstrongs, Ltd.	Dec.
Viscose Development Co., Ltd.	xix
Waeco, Ltd.	Sept.
Walker, Crosweller & Co., Ltd.	April
Walworth, Ltd.	xxx
Ward, Thos. W., Ltd.	May
Warwick Production Co., Ltd.	liii
Watten Emulsifying Machines, Ltd.	lxxxv
Webb, J., & Co., Ltd.	Nov.
Webster, Isaac, & Sons, Ltd.	xcii
Weir, G. & J., Ltd.	lxii
Wetter, J. C., & Co., Ltd.	Dec.
Whiffen & Sons, Ltd.	xcvi
White, Tomkins & Courage, Ltd.	lxii
Whittaker, Arthur	cvi
Widnes Foundry & Engg. Co., Ltd.	May
Willcox, W. H., & Co., Ltd.	l
Williams (Hounslow), Ltd.	lxxxvi
Williams, S. F., Ltd.	Nov.
Wynmouth Lehr & Co., Ltd.	April
York Shipley, Ltd.	Dec.
Young, B., & Co., Ltd.	Dec.

consistently better results

at less cost

1... where a liquid must be *filtered through cloth...*

50% cut in cloth costs! this saving should interest you!

2... where insoluble products are to be blended into a stable emulsion

3... where liquids must be mixed and heat-treated simultaneously

4... where continuous pasteurisation is required

5... where chilling, deep-freezing or refrigerated storage is called for

C.B. Filters, Homogenisers, Heat Exchangers, Mix Emulsifiers, Processing and Storage Vats, Freezers — the world's best — are the safest capital investment. Your enquiries are invited.

CHERRY-BURRELL

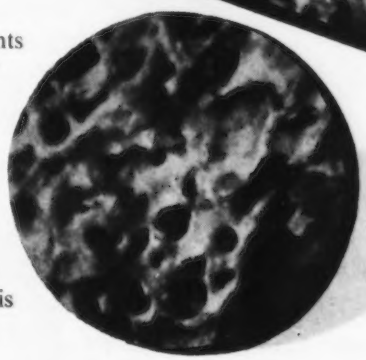
POWER ROAD CHISWICK LONDON W.4

Telephone: Chiswick 7631/4 Telegrams: Cherryburl (Chisk) London

The problem of NUTRITION

One of the greatest problems in the successful fortification of foods is to ensure that the added nutritious elements will be completely assimilated. Experts are agreed on the importance of including calcium and phosphorus in the diet of nursing mothers, growing children, invalids and old people.

But it has been proved that these elements are readily assimilated only when they are present in the ratio of two parts of calcium to one of phosphorus.



Fortunately the natural demand can be exactly fulfilled by the natural material. Edible Bone Phosphate contains calcium and phosphorus in the correct proportions in which it is best absorbed into the human system.

Only certain specially selected types of bone are used in the manufacture of Calfos Edible Bone Phosphate. In its final state it is available as a fine sterile white powder of 50, 100 or 200 mesh. It is approved for use in food products by the Royal Institute of Public Health and Hygiene and the Food Standards Division of the Ministry of Food.

Let us send you full technical information, and samples of Edible Bone Phosphate for testing on food fortification.

Edible BONE Phosphate

A Product of :—

CALFOS LTD., IMPERIAL HOUSE, KINGSWAY, LONDON, W.C.2. Phone : TEMple Bar 3629

"...WITHIN A FEW WEEKS THERE WERE NO RATS TO BE SEEN. FROM THEN ON A MONTHLY TREATMENT HAS BEEN CARRIED OUT AND **WE ARE ABSOLUTELY FREE OF THIS NUISANCE."**

—from a recent testimonial. Original can be seen at these offices.

The employment by the RATIN SERVICE of the latest scientific methods means that the natural cunning and suspicions of rats and mice are defeated, and whole colonies are wiped out. The RATIN SERVICE is the largest organisation of its kind, and has proved its efficiency over a long period by dealing with thousands of contracts under a variety of conditions at home and abroad.

Send to-day for the new illustrated booklet on how the RATIN SERVICE can help *YOU* to clear your premises and keep control of the menace.

RATIN SERVICE

covers the country

THE BRITISH RATIN CO. LTD., FELCOURT, EAST GRINSTEAD, SUSSEX

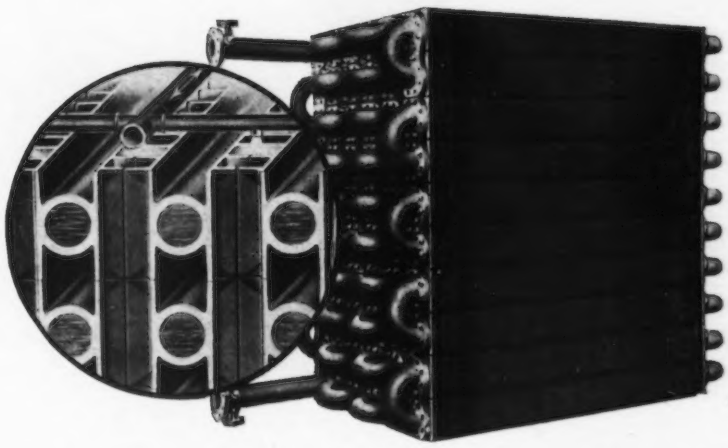
Telephone: LINGFIELD 591

BRANCHES AT: BELFAST, BIRMINGHAM, BOURNEMOUTH, BRISTOL, CARDIFF, CARLISLE, EXETER, GUILDFORD, HEREFORD, HULL, IPSWICH, LEEDS, LETCHWORTH, LIVERPOOL, LONDON (3 Branches), MAIDSTONE, MANCHESTER, NEWCASTLE-ON-TYNE, NORWICH, NOTTINGHAM, OXFORD, PRESTON, READING, SALISBURY, SHEFFIELD, SOUTHAMPTON, STOKE-ON-TRENT. THE SCOTTISH RATIN COMPANY: ABERDEEN, DUMFRIES, DUNDEE, EDINBURGH, GLASGOW.

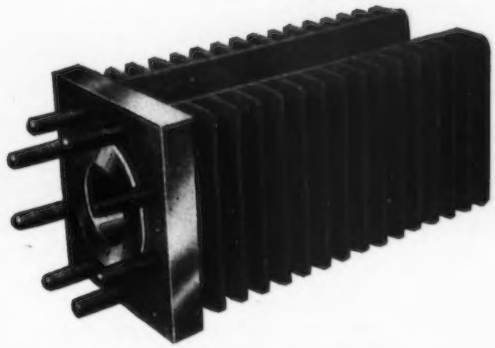
Save Fuel

by recovering waste heat in a

SENIOR ECONOMISER



Senior-H (Cast Iron) Economiser: For all industrial pressures.



Construction of H-Tube Economiser Element, showing Straight Gas Passages.

It recovers the heat from the waste hot flue gases and puts it into the boiler feed water, often saving 15 per cent. of the fuel used. It quickly repays the cost of installation, often in less than a year.

The gas passages formed by the straight H-type gills on the heating elements do not collect dust and the heat recovery is kept at a maximum, usually without the use of soot blowers. Attention and maintenance costs are correspondingly low and availability high.

Senior Twintube Economiser: For higher pressures as used in Central Power Stations.

Senior Welded Economiser: For pressures up to the highest, when the feed-water is suitably conditioned.

SENIOR ECONOMISERS LTD., 11 SOUTHAMPTON ROW, LONDON, W.C.1

Telephone: Holborn 7543-4 and 1158 Telegrams: Senioreco, Westcent, London

THE ELLISON SERVICE

CONSULTATION...

ELLISON ENGINEERS WILL HELP YOU

Whether your problem is the complete electrical control of a factory or only the most satisfactory control of a single machine, an Ellison Engineer will gladly assist you. Just get in touch with Head Office or phone our nearest branch office at :—

LONDON · BIRMINGHAM · CARDIFF
MANCHESTER · LEEDS · NEWCASTLE-ON-TYNE · GLASGOW

YOU CAN RELY ON AN ELLISON PRODUCT

TRADE MARK
GEORGE ELLISON
LIMITED
BIRMINGHAM ENGLAND

SEND FOR DESCRIPTIVE LITERATURE

673

Disposal of an Important

BULK CONVEYING

and

LOADING-OUT PLANT

GEORGE COHEN SONS & CO. LTD

have been entrusted by the Overseas Food Corporation with the disposal of a magnificent complete Bulk Conveying and Loading-Out Installation, manufactured by the Simon Handling Company and designed for handling ground nuts or similar material from warehouse to ship.

The plant is unused and may be readily adapted for handling other materials. It has a capacity of 500 tons per hour in 2 streams each of 250 tons and consists of two main conveyors, 36″ wide troughed type, 590 ft. long, mounted one above the other in lattice steel braced, corridor type structure.

Complete with two auxiliary conveyors, each 205 ft. long, running from a Junction House on main conveyors to 2 Sacking Stations. The Plant is at present motorised for 400 volts, 3 phase, 50 cycles A.C. supply.

General layout drawings and full details are available.

THE 600 GROUP OF COMPANIES

GEORGE COHEN

SONS AND COMPANY LIMITED

WOOD LANE, LONDON, W.12 · Telephone: Shepherds Bush 2070 · Telegrams: Omniplant, Telex, London
STANNINGLEY, near LEEDS · Telephone: Pudsey 2241 · Telegrams: Coborn, Leeds

And at KINGSBURY (Nr. TAMWORTH); MANCHESTER; GLASGOW; MORRISTON, SWANSEA; NEWCASTLE; BELFAST; SHEFFIELD; SOUTHAMPTON; BATH; DUNFERMLINE

FM/SIII/PG72

an emergency case . . .

. . . diagnosed as an acute shortage of containers, threatens our supply lines. The only cure that can be prescribed at present is for you to store each empty container carefully after use, and until the C.R.S van calls. In this way we can keep up the supply of goods to you-thereby defeating the threat to the trade caused by the lack of material available for the manufacture of containers.

CONTAINER *recovery service*

IT MUST COME BACK C·R·S

S.P.D. LIMITED,
3-5 SALISBURY SQUARE, LONDON, E.C.4

CRS 78-5-80

The Modern Method of FOOD PROTECTION....

COATES
PRESERVEX M.U. LACQUER

The Lacquer with
FOUR GREAT POINTS IN PERFORMANCE

1. The only satisfactory Universal Canning Lacquer on the British Market
2. Resistance, both chemical and mechanical of outstanding merit for food packaging
3. Less critical of variations in application
4. Unusually high performance on aluminium

COATES BROTHERS INKS LTD., and F. J. BALLARD & Co. Ltd.
the well known manufacturers of stoving ovens have formed an association to market the latest development in tinplate printing ovens

COATES-BALLARD RAPID HEAT TRANSFER OVEN
The supply of special tinplate printing inks, also coatings and lacquers for use in conjunction with these ovens will be undertaken by:—

COATES BROTHERS INKS LTD.
EASTON STREET, ROSEBERY AVENUE, LONDON W.C.1
Main Factory:—St. Mary Cray, Kent

Factories also at — MANCHESTER 38 King Street West; LEEDS 3 Cholley Lane; GLASGOW 31-47 Camden Street, C.5

OVERSEAS MANUFACTURING COMPANIES

COATES BROTHERS & Co. (S.A.) PTY. LIMITED Aerodrome Road, Maitland Cape Town, South Africa

COATES BROTHERS (AUST.) PTY. LIMITED 272/274 Essex Street, Sydney Australia

COATES OF INDIA LTD 3-1 Canal East Road, Uttading Calcutta, India

COATES BROTHERS (N.Z.) LTD. 22 England Street, Ponsonby Auckland, New Zealand

Your product may be —

Small

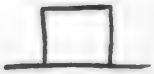
or large

or light

or heavy

triangular

rectangular

square 

or rhomboid

- **NONCURLING GUMMED PAPERS** for labelling every kind of product.
- **"GUMSTRIP" SEALING TAPES AND "GUMSTRIP" SEALING MACHINES** for sealing all parcels, packets and cartons.
- **"SAMSON" ADHESIVES** for every trade.
- **SELF-ADHESIVE SEALING TAPES** for security—protection and airtight sealing.
- **HEATFIX PAPERS** for labelling, packaging etc.
- **WATERPROOF MATERIAL** for home and export packing.
- **THE LIGHTNING LABELLER** moistens gummed labels in a second. Made in 3 in., 5 in. and 9 in. widths.

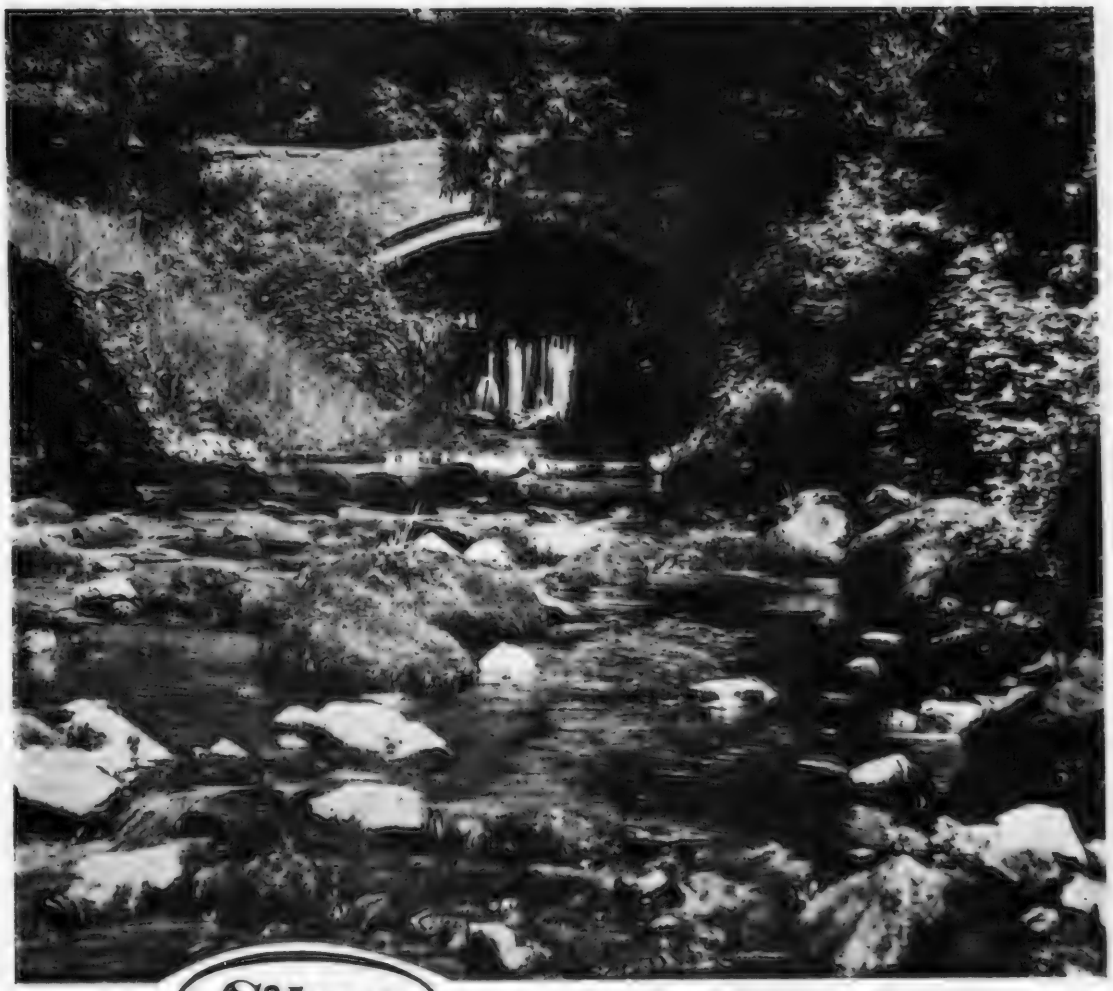
— but you can be sure it is safely packed if you use

BUTTERFLY BRAND PRODUCTS

Made by **SAMUEL JONES & CO., LTD.**

The House with the Packaging Service

NEW BRIDGE ST. LONDON, E.C.4. • GRAMS: NONCURLING LUD LONDON • TEL: CENTRAL 6500



Silver Stream GRADED **GELATINES**

they're **GOOD**

they're **GRADED**

With a system that scientifically grades the jelly strength, colour, viscosity, clarity, and p_H value, Silver Stream Gelatines **cannot** vary in consistency. There's a grade for every trade.

ALFRED ADAMS & COMPANY LIMITED
RELIANCE WORKS · WEST BROMWICH – Telephone 0263 (5 Lines)

Electric fork truck with hydraulic squeeze clamp attachment

One man built this wall

ONE MAN, using a battery electric fork lift truck, transported and stacked these packages . . . . one man with electric power instead of the team of men which would be needed without it. Electric trucks, their batteries charged over-night, take off-peak power for peak-hour work. Silent, easily and precisely controlled, *they save labour, time and factory space, by making efficient use of the available power supply.*

WHERE TO GET MORE INFORMATION

Your Electricity Board will be glad to help you to get the utmost value from the available power supply. They can advise you on ways to increase production by using Electricity to greater advantage—on methods which may save time and money, materials and coal, and help to reduce load shedding. Ask your Electricity Board for advice: it is at your disposal at any time.

Electricity for PRODUCTIVITY

Issued by the British Electrical Development Association

The EVERSHED "CENTROLLER"

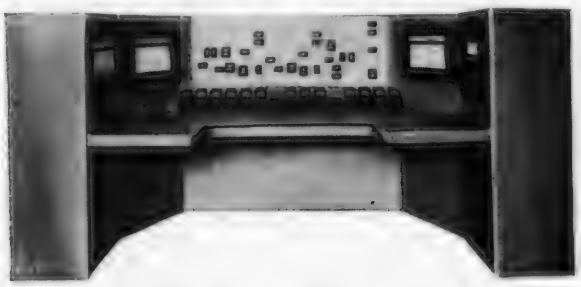
For Centralised Control of Plant

THE EVERSHED "CENTROLLER" concentrates in a single unit all vital data and controls for the centralised operation of plant. It comprises a console or desk on which are mounted many controllers, indicators and recorders and, usually a diagram incorporating miniature indicators at the appropriate points of measurement.

Centralised control is achieved by the Evershed Electronic System which facilitates remote indication and control of flows, levels, pressures, temperatures and other measurements.

Write for details of Evershed "Centroller" and of its various components and associated instruments, each of which can be supplied for separate operation if desired.

1	"Rollflow" Meter	Publication	FM 5
2	Circular Disc Recorder . .	Publication	FM 14
3	Precise Tank Gauge	Publication	FM 6
4	Tank Contents Gauge . . .	Publication	FM 4
5	Process Controller	Publication	FM 8
6	Electro-Pneumatic Relay . .	Publication	FM 7
7	High Level Alarm Switch . .	Publication	FM 13



EVERSHED AND VIGNOLES LTD

ACTON LANE WORKS · CHISWICK · LONDON W4

Telephone: Chiswick 3670 *Telegrams: Megger, Chisk, London*

6.11

IN ADDITION TO THE WORLD RENOWNED *6-POINT LABELLER*

THERE ARE

2 NEW types of NEWMAN LABELLERS

Nº 1 (Model C)

Gums labels completely

Powder Boxes, Cartons and other flat surfaces.

Nº 2 (Model B)

Fully Automatic

Labels, cylindrical objects, bottles, tubes, crayons, ampoules, batteries, etc. $\frac{3}{8}$″-1$\frac{3}{8}$″ diam. completely round, or with a gap or overlap.

D. TRAPOW & CO. LTD

ENGINEERS

(Dept. 4) 113 Regents Park Road, Chalk Farm, London, N.W.1. 'Phone: PRImrose 6688

BOTTLE SEALS
Protect your Product...and your Goodwill...
The simple and effective closure for those who pride themselves on the production and packaging of front-line food products. The seal which creates confidence in the minds of consumers abroad that branded goods are purchased as packed, and offers these additional advantages:—
★ NO MACHINERY REQUIRED FOR FIXING ★ PREVENT CORK BLOWING INEXPENSIVE ★ AVAILABLE IN ANY REQUIRED SHADE ★ PLAIN OR INDELIBLY PRINTED ★ HYGIENIC NON-INFLAMMABLE AND ODOURLESS ★ PARTICULARLY SUITABLE FOR EXPORT
FRENCH VINEGAR
MALT VINEGAR
BARBONA
Old English malt vinegar
SPADE
COFFEE
CHICORY
ESSENCE
TRANSPARENT VISKRINGS
THE VISCOSE DEVELOPMENT CO LTD. WOLDHAM RD. BROMLEY KENT ★
Telephone: Ravensbourne 2091
Telegrams: Viscose Bromley

"Temperature changes do not upset me" — says SHERLOCK OHMS — the finest metal detector in the world

In the course of a lifetime a good detector has to face up to many arduous conditions, especially in industry where working temperatures vary so much.

Sometimes I have to do my detecting in the freezing cold, sometimes in the sweltering heat, and on other occasions in places where the temperature is varying between extreme limits all day long.

So that I am immune to these changes, my designers have given me an unique electronic circuit that enables me to operate with 100% efficiency whatever the temperature.

Incidentally, have you written in for one of my new leaflets yet?

★The fifth of a special series issued by:

CINEMA-TELEVISION Ltd., Leaders in the field of metal detection, **WORSLEY BRIDGE ROAD, LOWER SYDENHAM LONDON, S.E.26 . . . . Telephone: HITher Green 4600**

A Company within the J. Arthur Rank organization

CINTEL

REGISTERED TRADE MA

CAPE TOWN

SAFE *in a Medway Case*

Throughout the world the products of leading British manufacturers are carried safely in Medway Cases. The Medway design, construction, and experience in manufacture, ensure that your product too, will be safe in a Medway Case.

CORRUGATED CASES

THE MEDWAY CORRUGATED PAPER CO. LTD., NEWHYTHE, MAIDSTONE, KENT

London Sales Office : Blackfriars House, New Bridge Street, London, E.C.4

DIVISION OF THE **Reed** PAPER GROUP

MALT FLOUR · DRIED MALT EXTRACT POWDER · MALT EXTRACT

Food manufacturers everywhere now use Fiona to give added distinction to an ever-widening range of products.

BISCUITS & HONEY · BREAD & CHEESE · BREAKFAST CEREALS
SWEETS & TOFFEES · MILK BEVERAGES · PICKLES & SAUCES
ICE CREAM MIX · CAKES & PASTRY · WINES & VINEGARS

Fiona malt products contain all the nourishing materials of malt ready processed and easily assimilated. Rich in sugars and proteins, containing valuable enzymes and vitamins, they are unrivalled in excellence and unique in their almost universal role in food.

EDWARD FISON LTD IPSWICH
THE MALTINGS IPSWICH
Maltsters for more than a Century

Analytical Control

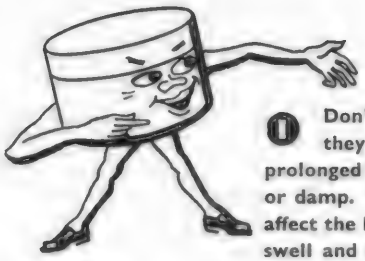
New!
'Edicol' Supra Colours

The well-known 'Edicol' colours are now being manufactured in a special grade within F.D. & C. specifications. These are known as 'Edicol' Supra Colours and enable foodstuffs manufacturers to achieve in their products the standards of purity demanded by the most exacting authorities in the world.

Samples and prices from

IMPERIAL CHEMICAL INDUSTRIES LTD., LONDON, S.W.1

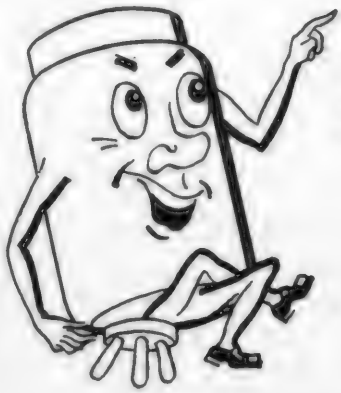
D.208



REMEMBER these points!

1 Don't store closures where they will be exposed to prolonged heat, excessive dryness or damp. Such conditions often affect the liners, causing them to swell and buckle or to curl and perhaps fall out.

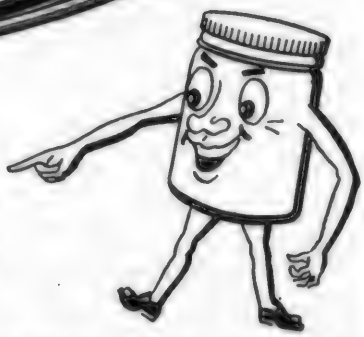
2 The supplier knows what techniques, colours, layouts, work best in production. Let him help you by submitting designs and suggestions.



3 Use the closures in proper rotation. Most suppliers put the date of manufacture on the package.

UGB

BOTTLES AND CLOSURES
The Perfect Pair



4 When re-ordering, quote the supplier's reference or job number and send a sample when possible, or describe the closure accurately and in detail. This often saves time, thus avoiding rushed work.

UNITED GLASS BOTTLE MANUFACTURERS LTD

8 LEICESTER ST., W.C.2 · *Telephone:* GERRARD 8611 (18 lines) *Telegrams:* UNGLABOMAN, LESQUARE, LONDON

NATIONAL PRIDE

The White Ensign is one of the great traditional symbols of National pride - pride in technical achievement, in the skill of the craftsman and in the courage and endurance of the men who guard the oceans of the world.

National Corrugated Cases represent the highest achievement in the protection of Britain's products on their journeys to all parts of the world.

NATIONAL
Corrugated Cases

THE NATIONAL CORRUGATED PAPER COMPANY LTD. · AYRES ROAD · OLD TRAFFORD · MANCHESTER

● *"you name it . . . I helped make it!"*

Glue for antagonistic surfaces

I'm never perplexed very long, about glue! Even when laminating difficult and varied surfaces that bristle with resistance, like heavily inked, lacquered and highly varnished finishes. Or "Pliofilm," acetate polyvinyl chloride, and other transparent sheeting, for advertising displays and packages. Emulsion adhesives dry to a clean, colourless, transparent film and eliminate inflammable solvents, thus reducing drying time from days to several hours. *. . . and listen!*

● "You name it . . . I helped make it!" Watch label adhesives at work. Protecting product identity by holding tight to "Cellophane," foil or paper labels, and to bottles that often reach labelling machines greasy, wet or hot, filled with mineral oil, olives or salad dressing. The NATIONAL touch is everywhere. Glue applied through imaginative research and service, to every item of daily life.

RESINS **National** **ADHESIVES**

ALL ENQUIRIES TO DEPARTMENT B, NATIONAL ADHESIVES LIMITED, SLOUGH, BUCKS

TELEPHONE: SLOUGH 23344

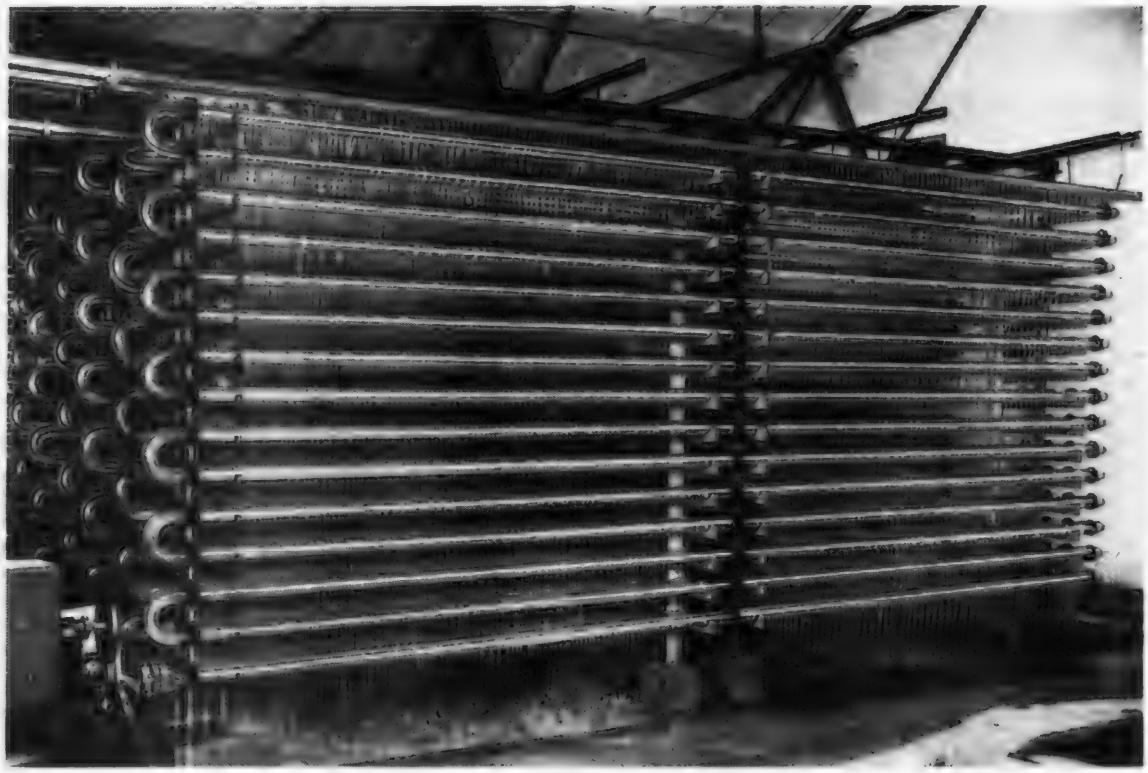
Flying Splice

Skill born of experience is required when feeding a new reel of tough kraft liner into a modern continuous running corrugating machine.

BOWATERS FIBRE CONTAINERS LIMITED

Purley Way · Croydon · Surrey · CROydon 5164

Issued by ASSOCIATED BOWATER INDUSTRIES LIMITED a member of the Bowater Organisation



2½ tons of 'PYREX' Brand "*Visible Flow*" Piping saved 21½ tons of Metal

IN the Heat Exchanger Bank here shown, 4,800 feet of 2" diameter 'PYREX' Brand "*Visible Flow*" Pipes were used, the total weight of glass being 2 tons 11 cwt. The same length of metal piping would have weighed quite 21½ tons.

The complete unit extracts 600,000 B.T.U's per hour from weak Hydrochloric Acid, with only 6·5 F mean temperature difference.

The installation was erected by our customer's own staff, with no previous experience, and without one breakage. Thus we are able to demonstrate both the efficiency and the economy of 'PYREX' "*Visible Flow*" Pipe Lines.

USE THIS COUPON.

Please send us leaflets describing the many uses of 'PYREX' Brand "*Visible Flow*" PIPE LINES in Industry.

Name.....

Address..... c 18,

'PYREX' Glass Pipe Lines are reducing costs and increasing efficiency in the following industries:

FINE CHEMICALS · HEAVY CHEMICALS
PHARMACEUTICAL · FOOD
PROCESSING · DAIRY · BREWING
MINERAL WATER · BOTTLING
SOAP & GLYCERINE · TANNING
BLEACHING · DYEING · TEXTILE
PETROLEUM · OIL FUEL
ESSENTIAL OILS

Our Glass technicians will gladly advise you on matters connected with the handling of liquids, or on any heat transfer problem.

'PYREX'
Regd. Trade Mark BRAND
Visible Flow
PIPE LINES

JAMES A. JOBLING & CO. LTD.
Dept. 18, Wear Glass Works · SUNDERLAND.

P 99

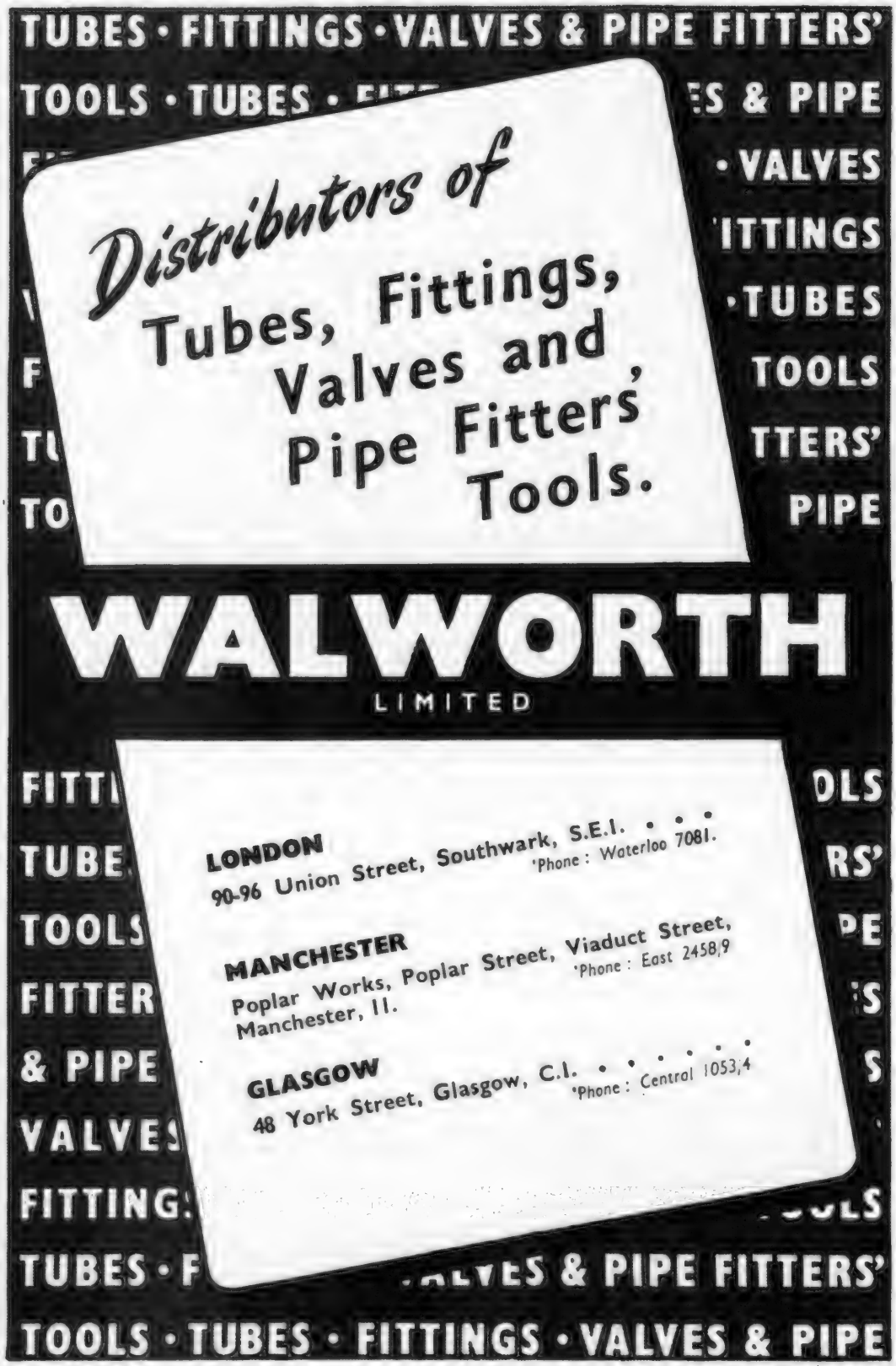
That's it!

The flavour that makes mouths water.
The meaty taste of meat brought out by a little Protex.
The natural flavour enhanced by a very little Protex.
It does them good. It does *you* good, for it sells your product.
Protex is protein: hydrolysed protein, rich in amino acids:
protein in its most digestive form. For bouillons, soups, stews, pastes,
gravies, sauces that sell *and* sell – add a little Protex.
A little but not too much.

PROTEX

For gentler flavour and subtly attractive aroma – **YEATEX,**
autolysed brewer's yeast, packed with nourishment and health.
Protex and Yeatex are the perfect pair for appetite. Let us send you formulae.

FREDK. BOEHM LIMITED · 19 Bentinck Street, London, W1 · Telephone: WELbeck 7933


TUBES · FITTINGS · VALVES & PIPE FITTERS'
TOOLS · TUBES ·
ES & PIPE
· VALVES
ITTINGS
· TUBES
TOOLS
TTERS'
PIPE
Distributors of
Tubes, Fittings,
Valves and
Pipe Fitters'
Tools.
WALWORTH
LIMITED
LONDON
90-96 Union Street, Southwark, S.E.1.
'Phone: Waterloo 7081.
MANCHESTER
Poplar Works, Poplar Street, Viaduct Street,
Manchester, 11.
'Phone: East 2458,9
GLASGOW
48 York Street, Glasgow, C.1.
'Phone: Central 1053,4
TUBES · FITTINGS · VALVES & PIPE
TOOLS · TUBES · FITTINGS · VALVES & PIPE

A soundly engineered truck of supreme quality

COMMER

7 TONNER with 'under-floor' engine

FEATURES

Powerful o.h.v. six-cylinder engine with chrome finished bores develops 109 b.h.p.

Robust four speed gearbox with helical gears, top and third.

Deep sectioned, wide-flanged frame.

Hydraulic two-leading-shoe brakes, vacuum-servo assisted.

Roomy all steel three-seater cab with controlled temperature gives increased comfort and improved visibility.

ALL THE EXPERIENCE gained from a close study of the needs of commercial vehicle operators at home and abroad is built into the Commer forward control seven-tonner with 'under-floor' engine. Powered by a fully proved o.h.v. engine which incorporates phenomenal life full length chrome finished bores, it is built to give long periods of trouble free service between overhauls.

The positioning of the 'under-floor' engine makes possible a greater degree of crew comfort and driving safety than ever before, the three-seater cab being specially designed to eliminate driver fatigue over long distances.

GO FORWARD WITH COMMER!

COMMER CARS LTD. LUTON BEDFORDSHIRE EXPORT DIVISION: ROOTES LTD. DEVONSHIRE HOUSE PICCADILLY LONDON W.1

Powdered

Gum Tragacanth

Whatever may be your trade, we can supply the grade of Gum you require, and the exact standard of mucilage you need.

The experience we have gained over many years as one of the largest importers, millers and distributors of gums, enables us to offer suitable grades for every purpose.

TRAGACANTH • ACACIA • KARAYA

POWDERED OR NATURAL

Mucilage • *Emulsification* • *Suspension*

The **UNITED INDIGO** *and* **CHEMICAL COMPANY** LTD.

HEAD OFFICE: MANCHESTER 4

WORKS: BLACKBURN · LEEDS · HUDDERSFIELD · PAISLEY BOSTON (U.S.A.)

• • planned production •

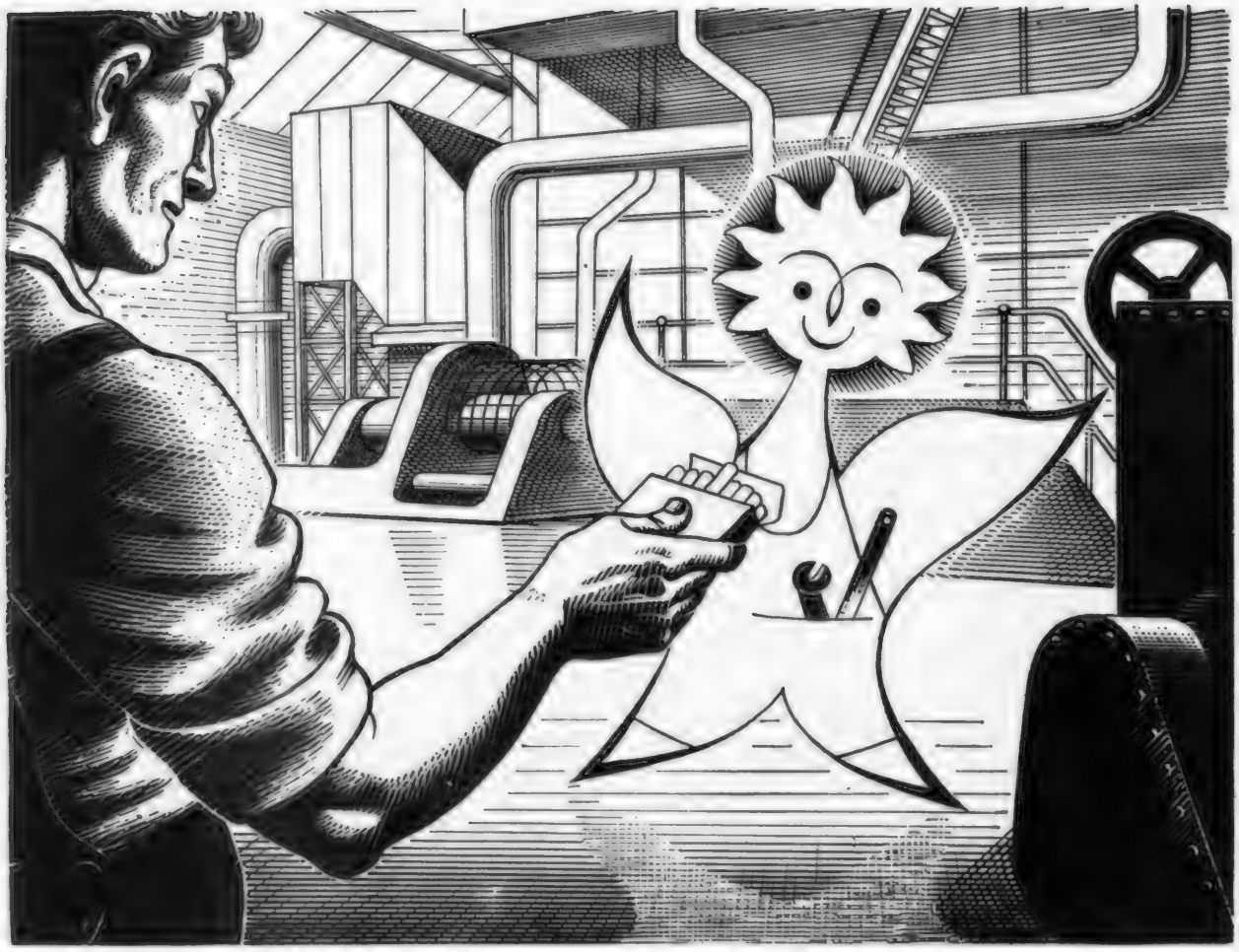
Skilled—wide-awake G.E.C. "Fractionals" start production buzzing—right from the word "go."

They come straight from the G.E.C. hive of industry where planned production is the key-note.

If *your* production plans will call for more G.E.C. "Fractionals" please buzz your order in right away, so we can include your requirements in our programme.

G.E.C. "Fractionals" 7

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2



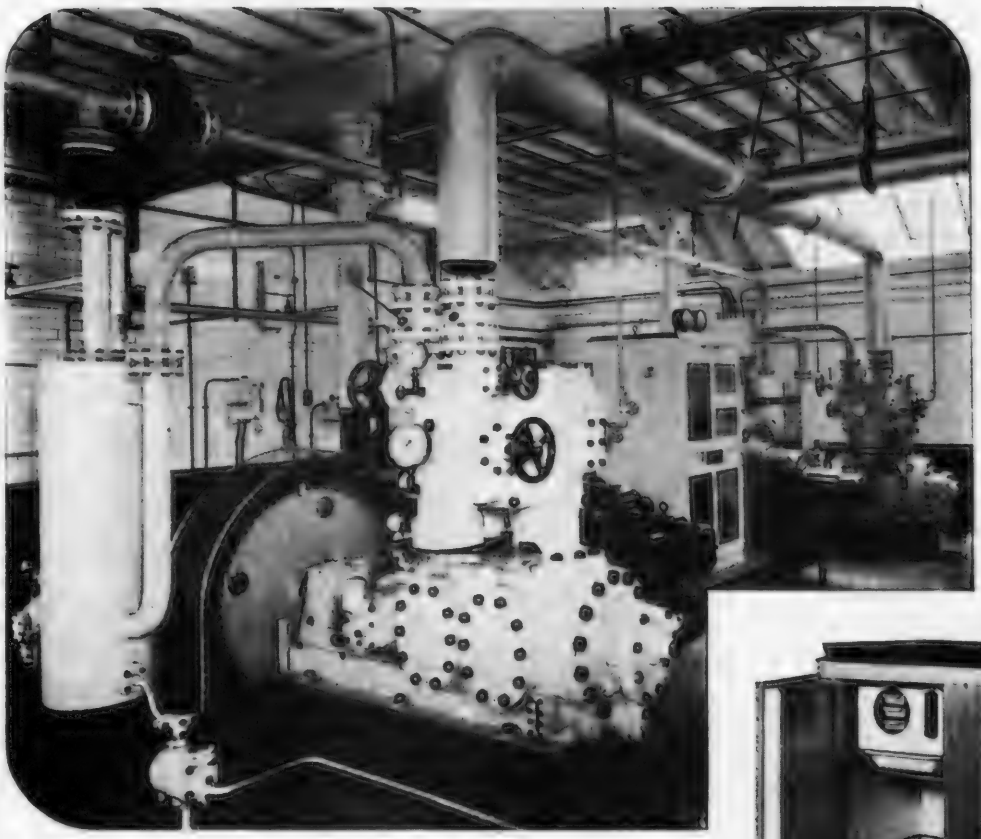
I NEVER SMOKE WHEN I'M WORKING! says Mr. Therm

No, Mr. Therm *never* smokes when he's working—and that's all the more surprising when you realise that he's working all the time. But gas equipment is so very clean in action, so completely free from ash, soot, or smoke that his helping hand is even welcomed where *surgical* cleanliness is essential. And since gas is also flexible, highly efficient, easily controlled and very rapid in heating from cold, you'll find Mr. Therm working all over Britain—and all round the clock too!

Mr. Therm's cereal story

Gas has a good tale to tell of its cleanliness in helping to make cereal foods. The machinery for puffing wheat, toasting and steam raising used by Quaker Oats Limited at Southall is largely gas-fired, and uses gas at the rate of 300,000 therms every year. Cereal-lovers know all about the happy ending in this case!

MR. THERM BURNS TO SERVE YOU THE GAS COUNCIL · 1 GROSVENOR PLACE · LONDON · SW1



THE COMPLETE RANGE OF

REFRIGERATION

Every aspect of commercial refrigeration is covered by plant and equipment manufactured by J. & E. Hall Ltd., whose products range from small refrigerated cabinets using compressors of ¼ h.p. to large ammonia compressors requiring driving motors of several hundreds of horsepower. The range includes units using methyl chloride, freon, ammonia and CO_2 as refrigerants. For marine purposes, plant designed and manufactured by J. & E. Hall Ltd. cools 63% of the whole world's refrigerated tonnage.

J & E · HALL

LIMITED

DARTFORD · KENT

Telephone : Dartford 3456

14-1174

Publications of The Food & Agriculture Organisation of the United Nations

GRASSLANDS

To be published January, 1952

Price 10s.

The Importance of Grasslands. Place of Grass in Agriculture. Rangeland Improvement. Livestock Management. Seeding and Fertilizing. Some Examples of Mechanical Treatment and Burning. National Programmes of Grassland Improvement. Fodder from Trees and Shrubs. Supplemental Feeding. The Need for Research.

EFFICIENT USE OF FERTILIZERS

To be published March, 1952

Price 10s.

The Role of Fertilizers. Plant Nutrients. The Necessity for Organic Matter. Commercial Fertilizers and Soil Amendments. Crop Sequences and Fertilizers. Plant-Nutrient Relationships to Soil Regions. The Farmer and the Agricultural Services. Converting Factors—General Measures (table).

Each chapter in these publications ends with a comprehensive list of books and reports for further reading.

We are publishing these books in Great Britain on behalf of the F.A.O. in Rome. Copies of other F.A.O. reports and any other books on agriculture can be obtained to order. We stock a number of British and U.S. publications, a list of which may be had on request.

★

LEONARD HILL LIMITED (Dept. F1)
17 Stratford Place, London, W.1

BRIDGES
OF LONDON

Sieving and Grading Machines

FOUR DIFFERENT GRADINGS IN ONE OPERATION

One, two, three or four gradings as required, with hopper or chute feeding for continuous operation, mean with Bridges Sieving and Grading Machines you do the job more quickly and efficiently than by any other method. There are five sizes of suspension type machines, supplied to your particular requirements. Write or 'phone for full details, *today*.

FULLY MOBILE FLOOR TYPE MACHINE

For manufacturers who require a machine which can be more easily moved. Vibrates in both horizontal and *vertical planes.*

S. N. BRIDGES & CO. LTD., BRIDGES PLACE, PARSONS GREEN LANE, LONDON, S.W.6 • RENown 1177/8

SO ADAPTABLE

it solves every factory lighting problem

SO UP-TO-DATE

it is ideal for modern industry

Modern lighting employing OSRAM cold cathode fluorescent lamps such as this plays a most important part in improving working conditions and raising output, as well as giving a most attractive appearance to the installation. Osram fluorescent lamps and G.E.C. fittings are available for all industries.

G.E.C. illuminating engineers will gladly check your existing lighting. Expert advice is freely available for new installations.

Osram

FLUORESCENT LIGHTING with *G.E.C.* fittings

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Pioneers in the welded fabrication of tanks

in aluminium and stainless steel

APV Stainless Steel Fruit Juice Storage and Feed Tank of 220 gallon capacity. Fitted with self-contained motor-driven agitator and hinged cover.

APV were the first to weld tanks and large vessels in aluminium in this country and they also pioneered the welding of stainless steel. This leadership in the technique of welding these metals has been maintained and largely accounts for the exceptional reputation that APV have gained in the fabrication of tanks for milk and the other potable liquids.

All-welded fabrication is incomparably superior for tanks owing to the absence of cracks and crevices but the production of consistently homogeneous welds in the corrosion-resisting metals is not easy and requires special skill and metallurgical knowledge. When the welds in tanks manufactured by APV are ground and polished they are invisible and the tank is virtually in one piece.

This flawless interior, combined with well radiused corners, adequate falls and well designed fitments have placed APV tanks in a category of their own.

Argon arc welding is now extensively employed in the fabrication of APV tanks resulting in stronger, cleaner and neater welds. APV were one of the first Companies in this country to employ argon arc welding and were recently responsible for a notable improvement in the process.

APV

APV manufacture insulated and uninsulated tanks of all types in any of the corrosion-welding metals. Rectangular and Horizontal Cylindrical Tanks are made in a range of standard sizes and Vertical Cylindrical Tanks to order. Receiving Tanks with or without strainers and weigh bowls are made in 60, 100, 200 and 300 gallon sizes.

APV Horizontal Cylindrical Insulated Tank. The agitator is the APV Quick-Release Glandless type with detachable couplings that allow the impeller to be dismantled for cleaning.

THE A.P.V. COMPANY LTD., WANDSWORTH PARK, LONDON, S.W.18. TELEPHONE: VANDYKE 4492

ASSOCIATED MANUFACTURING COMPANIES IN INDIA AND AUSTRALIA

The Solid Pack Meat Product that slides easily out of its tin needs...

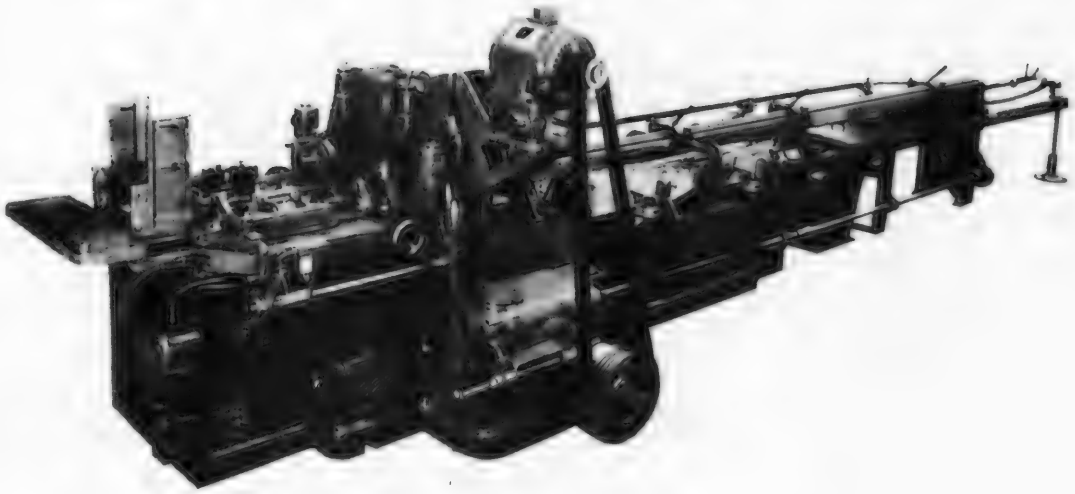
...HOLDEN'S

MEAT LACQUER

ARTHUR HOLDEN & SONS LIMITED BIRMINGHAM 9

300 A MINUTE

HIGH SPEED CAN MAKING



The BLISS No. 322N High Speed Can Bodymaker

This all-crank machine produces round, square or irregular shaped can bodies at a very high rate of speed. In the production of round can bodies, where it is most generally used, a speed of 300 a minute is easily attained and consistently maintained.

All working parts are open and readily accessible for inspection and adjustment for different sizes. Soldering attachments are supplied according to requirements, and attachments for beading and necking-in can also be furnished as required.

Let us solve your problems

E. W. BLISS (ENGLAND) LTD.

HEAD OFFICE AND WORKS:
CITY ROAD, DERBY
Tel.: Derby 45801

LONDON SALES OFFICE:
2/3 THE SANCTUARY
WESTMINSTER
LONDON, S.W.1
Tel.: Abbey 3651

BROADBENT

HIGH SPEED CENTRIFUGALS

for—

- ABSOLUTE UNIFORM EXTRACTION
- CLEAN AND RAPID PROCESS
- CONTROL OF MOISTURE CONTENT

- **FILTERING FROZEN EGGS**
- **MUSHING BREAD FOR SAUSAGES**
- **RECLAIMING CRYSTAL FROM LIQUOR**
- **DELIQUORING SEDIMENTS**
- **DRIED MILK, MILK SUGAR**
- **COFFEE ESSENCES**
- **MEDICATED WINES, ETC.**

PLEASE WRITE FOR FULL PARTICULARS

THOMAS BROADBENT & SONS LIMITED

TELEPHONE HUDDERSFIELD 5520 (6 lines) **HUDDERSFIELD** TELEGRAMS BROADBENT, HUDDERSFIELD

LONDON · LEICESTER · MANCHESTER · NEWCASTLE

..with Bulmer's

FIRMAJEL

PECTIN..

Jams set BETTER..
BRIGHTER..
CLEARER

FREE TECHNICAL SERVICE

Bulmers give a free technical service to all interested in pectin. Large and small users know that they can rely on their advice, in the same way as they can rely on Bulmer's Firmajel—the high standard pectin which is consistent in quality, pale in colour and free from starch. That is why more and more jam makers use Firmajel pectin only. Not only jam makers consult Bulmers but many others interested in the properties of pectin as a thickener and emulsifier for sauces, salad creams and many other products.

If pectin interests you, please write giving details of your requirements and ask for free samples.

Firmajel is delivered in tankers, casks and tins.

H. P. BULMER & CO. LTD., HEREFORD · *AND AT LONDON AND MANCHESTER*

MORGAN FAIREST LTD

All models are now available either left or right hand feed, thus enabling 2 machines to be fixed in a high speed line. Output up to 20,000 units per hour with one operator.

Features...

OF THE "BANKS" LABELLER

PATENTED ROTARY TABLES are now supplied for the feeding or collection where conveyor feed is not considered suitable.

ROTARY TABLE Mark F.M. is driven from machine.

ROTARY TABLE Mark S.C. is self-contained with variable speed drive.

Incorporating many desirable user—and package—benefits, the "Banks" Labeller features:

High Production—from 40 to 170 containers per minute. For some types of containers up to 240 per minute.

Continuous Motion—Containers are labelled without interruption to the speed at which they pass in straight line through the machine.

Vertical Position—All containers remain upright during labelling.

Perfect Registration—Unique method of affixing label ensures hairline registration.

No overlapping of Glue—Glue is applied to label only, eliminating traces of surplus adhesive beyond edges of label.

Use of Various Labels—The "Banks" Labeller can be arranged to label on all around or part label, single spot labelling and front and back duplex labelling, all round labelling up to 12" length of label.

Six different models of the "Banks" Labeller are available to label vials, bottles and other cylindrical containers and all models can be arranged for conveyor feed or, alternatively, Patented Automatic Infeed Rotary Tables. The machine illustrated is fitted with conveyor feed.

For complete details write Morgan Fairest Ltd.

FAIRWAY WORKS, SORBY ST., SHEFFIELD, ENGLAND

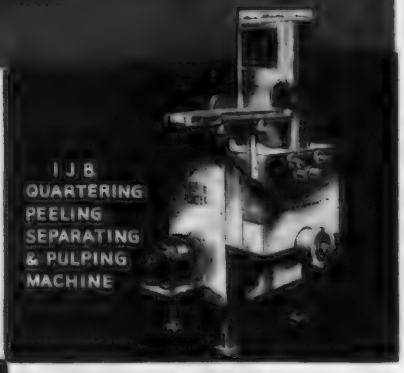
KELLIE

for FOOD PLANT

The [illegible] reputation, among [illegible] manufacturers, of Kellie plant and service is sustained. As it has been built, by preference to make any kind of machine and satisfy any special need at the lowest [illegible]

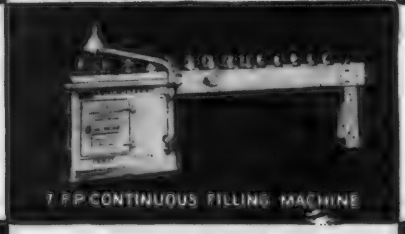
EXTRA RAPID BOILING PANS

Pulping and
Separating Machines.



I J B
QUARTERING
PEELING
SEPARATING
& PULPING
MACHINE

Filling and
Syruping Machines.



7 F P CONTINUOUS FILLING MACHINE

Washing and
Sterilizing Machines.

9 J J CONTINUOUS ROTARY BOTTLE & JAR
WASHING MACHINE

Complete Filtration
Process Plants.

8 B BLANCHER & RE-WASHER

Nine aspects of Kellie activity are brought to notice above: there are more than two hundred and fifty other individual machines, covering most manufacturing processes. The scale of this effort can be gauged against the more than one hundred complete process plants they have installed, throughout the world, for preserve manufacture alone.

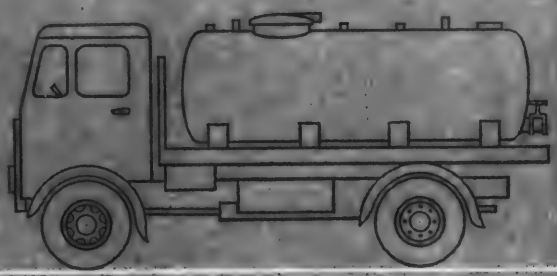
ROBERT KELLIE & SON LIMITED

DUNDEE SCOTLAND

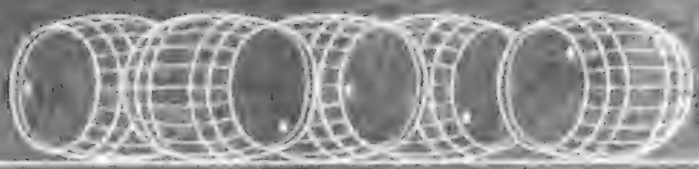
Hopwood

Elpex APPLE PECTIN

Delivered by tanker.....



or in barrels..



whichever you prefer

n Tanker or Cask! But although the methods of delivery vary as specified by our customers there are o two ways about the jel-making qualities of Elpex Apple Pectin. They never vary, so ensuring a firm set with the colour and texture of the fruit unimpaired. Every batch of Elpex is tested for jel-making strength and is starch free. That is why it is so consistently dependable. Further choices are the supply of Pectin free from preservative in sealed tins and powdered Citrus and Apple pectins in various grades.

Wm EVANS & CO. (HEREFORD & DEVON) LTD., WIDEMARSH, HEREFORD. Est. 1850

An Announcement . . .

DUREX ABRASIVES LTD wish to announce that as from June 14th, 1951, the name of the Company has been changed and is now the MINNESOTA MINING & MANUFACTURING COMPANY LTD.

Identification will be as before, except that the words "Scotch Boy" will be used instead of "Durex" as a prefix to the name of the material, *e.g.*, "Scotch Boy Tapes" instead of "Durex Tapes".

Existing high standards in the quality of the products will be maintained, the change is in name only.

'SCOTCH BOY' *Cellulose* TAPE

"SCOTCH BOY" Cellulose Tape supplied in rolls 72 yds. long and in a variety of widths and colours.

Distributive arrangements unchanged.

Manufactured by

MINNESOTA MINING & MANUFACTURING COMPANY LIMITED

ARDEN ROAD, ADDERLEY PARK, BIRMINGHAM 8

StaffAllenS
Founded 1833

SPICE OILS

Our own-distilled oils of the finest quality include

CELERY · CINNAMON
CLOVE · CORIANDER
GINGER · NUTMEG
PIMENTO

Send us your enquiries and orders

STAFFORD ALLEN & SONS LTD. Wharf Rd. London N.1 CLErkenwell 1000

TAS/AL.904A

ALIKE AS TWO PEAS?

Yet what a world of difference! For the pea that is processed in hard water will be tough, wrinkled, tasteless and of poor colour. But how delicious the pea that is processed in Permutit Softened Water — plump, tender and garden-fresh in looks and taste.

There are many other food processes that will benefit by the introduction of a Permutit plant. It will pay you to write for more details.

The **PERMUTIT Co. Ltd.** *Dept. W.L134, Permutit House, Gunnersbury Avenue, London, W.4 · CHIswick 6431*

HYFOAMA ⟷ EGG-WHITE

1 LB. = WHITE OF 220 EGGS
1 LB. = 1½ LBS. OF DRY EGG-ALBUMEN

RECIPE-BOOKLETS
ADVERTISING-MATERIAL
FREE OF CHARGE

MANUFACTURERS:
LENDERINK & CO. LTD.
SCHIEDAM (HOLLAND)

Wilcox's

HOP
8022
(25 lines)

understand your
ENGINEERING
NEEDS

W. H. WILLCOX & CO., LTD.
SOUTHWARK HOUSE, S.E.1

–a T & N package can take it by land, sea or air

Our business is growing all the time as more and more people realise the importance of the *right* packing. T & N corrugated fibreboard packings simplify, beautify and fortify. We always welcome new packaging problems.

T&N *Corrugated Fibreboard Cases and Corrugated Packaging are used extensively for export and home Packaging of : —*

FOOD AND CONFECTIONERY • WINES AND SPIRITS ELECTRICAL GOODS • RADIO • MOTORING REQUISITES CHINA, GLASS, HARDWARE • PAINT • PROPRIETARY CHEMICAL PRODUCTS • LEATHER GOODS • BOOKS FOOTWEAR • FRESH FRUIT AND CUT FLOWERS, ETC.

THOMPSON & NORRIS

Pioneers of Corrugated Packaging

THE THOMPSON & NORRIS MFG. CO. LTD.,
Great West Road, Brentford, Middlesex.
Telephone : EALing 4555

FACTORIES ALSO AT CORSTORPHINE, EDINBURGH.
SHIRLEY, BIRMINGHAM · HISTON, CAMBS.
WARRENPOINT, CO. DOWN.

T&N

AIL

MANUCOL

A PURE FOOD COLLOID

for stabilising · thickening · gelling · suspending

Manucol is a home produced vegetable colloid. It is uniform in quality, easy and economical in use, and readily soluble in hot or cold water. Manucol may solve your problem and improve the quality and appearance of your product. A request from you will bring full details in terms of your particular application. The full co-operation of our Technical Service Department is at your disposal.

ALGINATE INDUSTRIES

LIMITED

Walter House, Bedford Street, Strand, London, W.C.2

TELEPHONE: TEMPLE BAR 0451

Hitch YOUR problem to a star!

HERMETIC CLARIFIER FOR BEER, VARNISHES ETC.

CONTINUOUS STARCH CONCENTRATOR

CLARIFIER FOR LIQUIDS OF HIGH SLUDGE CONTENT

HIGH CAPACITY ENCLOSED SEPARATOR FOR OILS

CONTINUOUS 3-WAY SLUDGE SEPARATOR

THERE ARE OVER 100 TYPES OF

Install De Laval and you get the world's most efficient centrifugal separator . . and in addition a type specially designed to handle your particular product! Every De Laval user can therefore be assured of a star performance! Send for General Catalogue No. 16500.

DE LAVAL CENTRIFUGAL INDUSTRIAL SEPARATORS

ALFA-LAVAL CO. LTD. · GREAT WEST ROAD · BRENTFORD · MIDDLESEX · Phone: EALING 0116 (P.B.X.)

DL.208

MIXING BOWL

(HEAVY GAUGE)

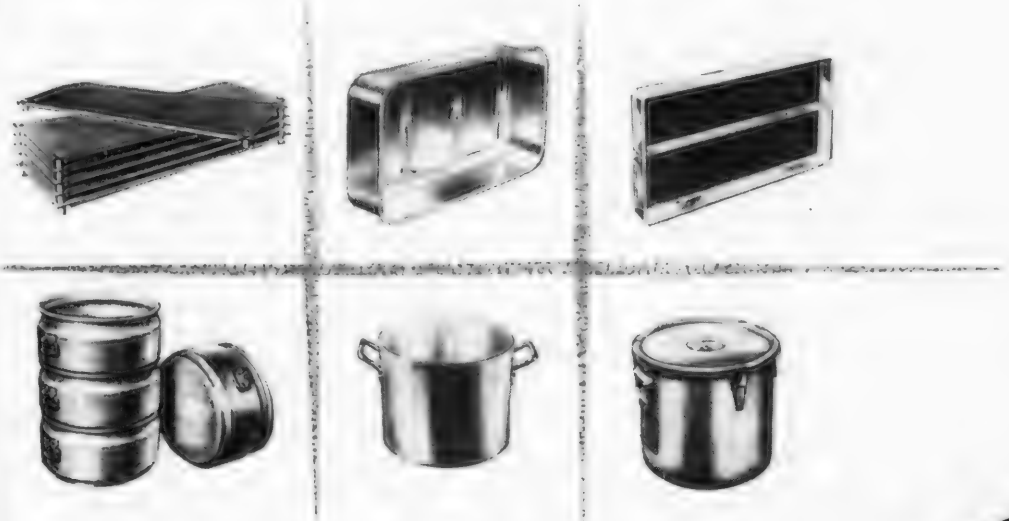
Size	Capacity	Size	Capacity
13″ diameter	2½ gallons	22″ diameter	15 gallons
15″ ,,	4½ ,,	26″ ,,	22 ,,
18″ ,,	6 ,,	30″ ,,	35 ,,

Manufactured from 10 gauge commercially pure aluminium, with aluminium alloy handles attached by countersunk rivets to give a smooth interior.

The 18″ diameter and larger sizes can also be fitted with steel wearing skids.

Light gauge bowls with beaded rims, no handles, also available in 13″, 15″ & 18″ dia.

WARWICK
First Choice
for
ALUMINIUM EQUIPMENT



WARWICK PRODUCTION CO. LTD.

IN ASSOCIATION WITH ARMIN LIMITED FARNHAM ROYAL-BUCKS

SALTISFORD, WARWICK TELEPHONE: WARWICK 693-696

Specialists in the Development and Fabrication of Light Alloys

Warco
REGISTERED TRADE MARK

IRISH SWEETENED FATS

Manufactured to your requirements with
PALM KERNEL OIL, COCONUT OIL, Etc.
Sugar content not to exceed 30%

SUPPLIED EX UNITED KINGDOM PORTS

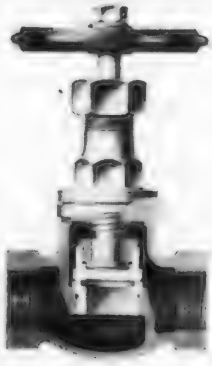
Enquiries invited

GENERAL SALES (IRELAND) LIMITED

14 HAWKINS STREET, DUBLIN

Phones: 63442, 74785 *Telegrams:* 'Brokerage, Dublin'

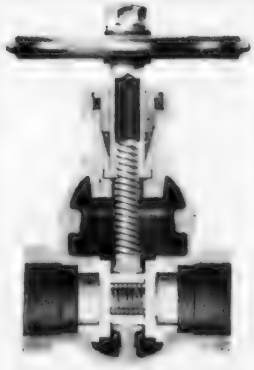
HOPKINSONS' BRONZE VALVES . . .



"S.T.S" VALVE, a reliable long service, general purpose valve.

PARALLEL-SLIDE LINK VALVE, quick-opening, for many industrial purposes.

"MAC" VALVE, an alternative to the "S.T.S".



PARALLEL-SLIDE VALVE, for two-direction flow.

All available in sizes up to 2" bore. Steam pressures to 250 lb/sq. in.

. . . for long trouble-free service

These small bronze valves are of very robust construction and they can all be relied upon to give fluid-tight service over exceptionally long periods.

HOPKINSONS LIMITED · HUDDERSFIELD

LONDON OFFICE: 34, NORFOLK STREET, STRAND, W.C.2

HV 35

Packaging Perfection

with

cart

di

c

le by Stonehouse Bros. Ltd.

DU

Handy-Andy

WARM AIR TOWEL

DRIES HANDS—
QUICKLY, THOROUGHLY,
HYGIENICALLY &
CHEAPLY

FOR USE IN
KITCHENS
WORKS
OFFICES
CANTEENS
BAKERIES
HOTELS
DISPENSARIES
SURGERIES
THEATRES
SCHOOLS
PUBLIC CLOAKROOMS
AND OF COURSE IN THE HOME

✱ **Cuts out laundry bills and does away with damp grubby towels. Provides a fresh dry 'towel' for every user every time.**

Phone KINgston 7969 or write for full details to:

QUIZ ELECTRICS LTD.

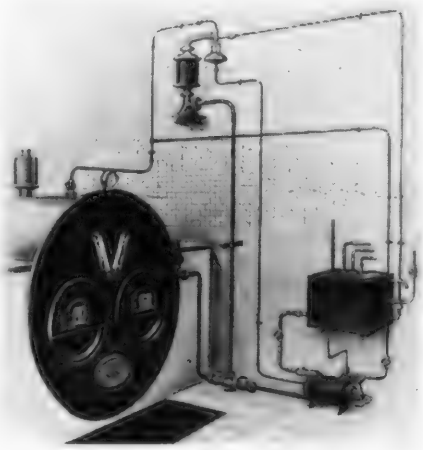
160 HIGH STREET, TEDDINGTON, MIDDLESEX

ROYLES

Patent

AUTO-THERMAL FEED..

..saves you money



by automatically returning all Hot Condensate—the purest feed water—to the boiler. It will also deal with any "make-up" required. Fuel consumption is reduced, boiler maintenance is less and upkeep of the apparatus is negligible as compared to a pump.

Royles Ltd. IRLAM, MANCHESTER *Phone: Irlam 2094 (3 lines) Grams: ELyor, Irlam, Manchester*

Hopwood

THE DRUMS RETURN !

THE use of 'TRAPINEX' Paint Transfers enables you to make bulk purchases of standard containers to which your individual markings may then be applied—at three times the speed of normal stencilling.

Produced in brilliant paint they will neither tear, rub nor flake off. They are acid- lubricant- and weather-proof and add tone and individual character to your products.

These forceful markings ensure the return of your valuable containers.

World-famous companies, great national advertisers, government departments and ministries find 'TRAPINEX' the ideal solution to a surprising number of problems.

Existing users include: *Austin Motor Co, Berger Paints, BOAC, Cadburys, Cherry Blossom, Daily Express, Dunlop, Frigidaire, GEC, Gilbey's Wines, Hoover, Hornimans, Hovis, Idris, ICI, Kiwi, Lever Bros, Mars, Meltonian, Murphy Radio, Nuffield Organisation, Nuswift, Osram, Phillips' Rubbers, Remington Rand, Rufflette, Sebels, Smith's Clocks, W. H. Smith, Vacuum Oil, Wm. Wren Ltd, etc, etc.*

Research and Advice

The services of the 'Trapinex' Research Laboratory, Designers and Planners, are at your disposal. Write now for an interesting booklet that will show how 'TRAPINEX' can help you with your packaging, advertising and general industrial marking problems.

P.S. 'Trapinex' Drum markings ensure a First Class Return Ticket for your containers.

FOR QUICK RETURNS—MARK YOUR DRUMS WITH

TRAPINEX (Regd)

Trapinex (Regd) Paint Transfers are fully patented and manufactured only by:—

TRAPINEX LTD, 129 COMMERCE HOUSE, HIGH ROAD, LONDON N.22

TRANSFER MANUFACTURERS AND DIRECT PROCESS PRINTERS

Phone: Bowes Park 6811/3. Grams: Trapinex, Wood. London. Cables: Trapinex London

ON THE SURFACE

It may be an operating instruction on some remote bit of machinery; an identification mark on some novel plastic pack; a publicity idea beyond the scope of printing and too expensive for hand-painting. But whatever it is, 'TRAPINEX' usually provides the answer. In fact, 'TRAPINEX' does not often meet a marking problem to which a ready (and economical) solution cannot be found. Write to the address below giving specimens if possible—there's no obligation of course.

ANYWHERE YOU LIKE !

'TRAPINEX' can put your name anywhere, whether it be on a retailer's window, on vans or trucks, on buses and in tube trains, on your containers, on packs or on the product itself. The tenacious 'TRAPINEX' paint transfer reproduces name-plates, designs, devices and trade-marks, slogans, warnings, etc.

All colours of the rainbow (and a few of our own) are easily and effectively reproduced, no design is too intricate and no job too large. There are very few surfaces for which the 'TRAPINEX' laboratory hasn't yet perfected the ideal transfer that will give fully satisfactory results.

SO VERY EASY TO APPLY

The application of 'TRAPINEX' Paint Transfers is simplicity itself and can be carried out by totally unskilled labour. A special Fixing Service for shop windows is available throughout the U.K.

INTERESTING OFFER

There is a very interesting little booklet, which is yours for the asking, dealing with the many uses of 'TRAPINEX.' We should be pleased to send you a copy and to help you, to the best of our ability, with any of your marking problems.

'TRAPINEX' NETS SALES FOR A NATIONAL NEWSPAPER

NEGRETTI & ZAMBRA LTD.

122 REGENT STREET, LONDON, W.1 Regent 3406. Telegrams: Negretti, Piccy, London

Manufacturers of Instruments for the indication, recording and controlling of temperature, pressure, liquid level, volume, specific gravity, humidity, etc.

Illustrated is our Dial Thermometer (with dial cut away to show mechanism) constructed on the Mercury expansion principle.

Made in three sizes 4", 6" and 9" available with a wide variety of sensitive bulb fittings to suit individual applications.

Guaranteed for two years from date of supply. Send for List T/40 dealing with our range of Mercury-in-Steel Thermometers.

BRANCHES: Birmingham, Leeds, Manchester, Nottingham, Glasgow, Cardiff.

OVERSEAS AGENTS in: Argentina, Australia, Belgium, Brazil, Canada, Czechoslovakia, Denmark, Egypt, Eire, Finland, France, Greece, Holland, Iceland, India, Italy, New Zealand, Northern Ireland, Norway, Palestine, Portugal, S. Africa, Spain, Sweden, Turkey.

Technical Services available in most countries

KIBBLED ONIONS ESSEF BRAND ONION POWDER

TRADE MARK
STANDARD FOOD PRODUCTS CO.
ESSEF BRAND
N.G. PAPASSOTIRIOU & CO
ALEXANDRIA EGYPT

The most up-to-date plant with the largest production in Egypt

Produced at the above plant of

THE STANDARD FOOD PRODUCTS CO.
N. G. Papassotiriou & Co.
ALEXANDRIA, EGYPT

Enquiries to:

A reliable source of supply of a high quality product

S. F. P. (FOOD PRODUCTS) LTD.

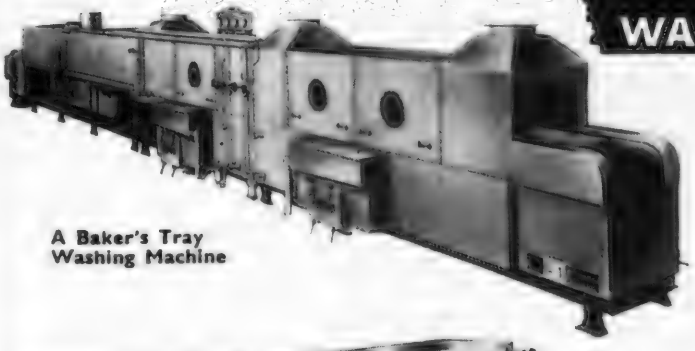
22a COLLEGE HILL, CANNON STREET, LONDON, E.C.4. TELEPHONE: CITY 3731 2 TELEGRAMS: ZICAMBIADI, LONDON

Worth looking into—Dawson

FOOD UTENSIL WASHING MACHINES

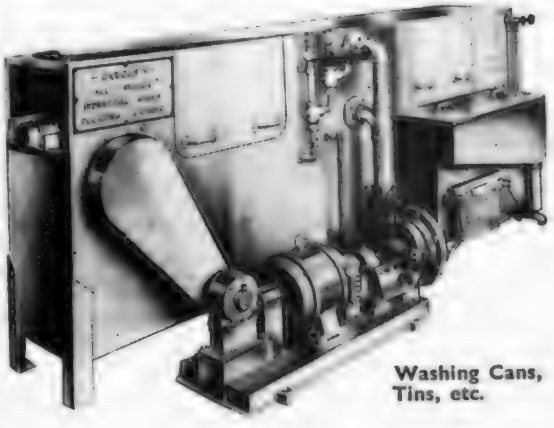
are being used by more and more Food Manufacturers for cleaning

CANS, TRAYS, BOTTLES, JARS, TINS, BOARDS, PANS, MOULDS,
and for washing
VEGETABLES

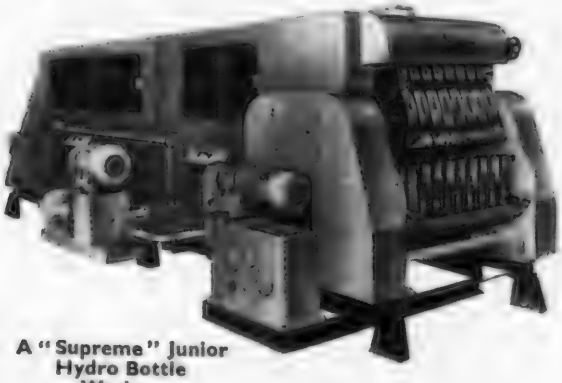


A Baker's Tray Washing Machine

The washing and sterilizing of all kinds of utensils used during manufacture and of the containers in which food products are finally sold, is quickly and economically done by Dawson Hydro Washing machines. These machines are supplied to suit every size and shape of tin, can, jar or bottle, and are today operating in many of the largest food-producing factories.



Washing Cans, Tins, etc.



A "Supreme" Junior Hydro Bottle Washer

Washing and Drying Sweet Jars

Washing, Delabelling, Rinsing and Drying Biscuit Tins

The most practical way of cleaning Food Utensils.

DAWSON BROS. LTD.

GOMERSAL, LEEDS. *Tel.: Cleckheaton 1080 (5 lines)*

London Address: **406 Roding Lane South, Woodford Green, Essex**
Tel.: Wanstead 7777 (4 lines)

WILLIAM BRYAN LTD

For Finest Quality

PEPPER & SPICES

MACE, NUTMEGS, GINGER, CINNAMON, ETC.

HERBS **KIBBLED ONIONS**

VEGETABLE EXTRACT **ONION POWDER**

Send your enquiries to :

3 LOVAT LANE
EASTCHEAP, LONDON, E.C.3

TELEPHONE NO.: MAN 1457. TELEGRAPHIC ADDRESS: VOLTZINE, BILGATE, LONDON

DUST IS DANGEROUS !

The MUSGRAVE Aerodynamic DUST COLLECTOR (Systeme Linderoth) is based on an entirely new principle of separation, and offers the following advantages over other types :—

- HIGH DUST COLLECTING EFFICIENCY.
- HIGH CAPACITY WITH CONSIDERABLE SPACE ECONOMY.
- SELF CLEANING FILTER SURFACE WITH MOST DUSTS.
- CONSTRUCTED ENTIRELY OF STEEL (OR OTHER METALS TO SUIT SPECIAL CONDITIONS).
- MINIMUM FIRE RISK.
- SUITABLE FOR HOT GASES.
- CONSIDERABLE SAVING IN STEEL BOTH IN COLLECTOR AND SUPPORTING STRUCTURE.
- LOW RESISTANCE WITH CORRESPONDING LOW POWER CONSUMPTION.
- RELIABILITY AND MAXIMUM AVAILABILITY IN SERVICE.

Write to-day for illustrated Brochure.

MUSGRAVE & Co. Ltd. **ST. ANN'S WORKS, BELFAST**
and at LONDON, MANCHESTER, GLASGOW, BRISTOL, NEWCASTLE-ON-TYNE

THOUGHT *for food*

"WEDCO" SYSTEMS SAVE AT EVERY TURN

Our principle thought when designing Conveyors for use in the food industry, is to produce an installation that will provide maximum hygiene with maximum efficiency. The use of tubular construction, woven wire stainless steel or food quality rubber belts, hinged assemblies and other special constructions for easy cleaning, are but a few of the many good reasons why "Wedco" Conveyor Systems are finding ever-increasing favour with leading food manufacturers.

Our Catalogue on Mechanical Handling in the Food Industry is most informative. May we send you a copy?

THE BRITISH WEDGE WIRE CO. LTD.
RICHMOND WIRE WORKS, WARRINGTON
Telephone : Warrington 3207/8 Telegrams : "Wedco" Warrington

London Office: 687 Finchley Road, N.W.2. Branches at Birmingham, Cardiff, Glasgow and Sheffield

dm. BW 111

Reigate Brand

VANILLA NATURA

AN ENTIRELY NATURAL PRODUCT, GUARANTEED TO BE FREE FROM ANY ARTIFICIAL FLAVOURING OR COLOURING MATTER WHATSOEVER.

For samples and full details of this outstanding product write:

WHITE, TOMKINS & COURAGE LTD.

REIGATE · SURREY *Phone: Reigate 2242/3*

WEIR REFRIGERATION

For Food Storage, Water and Milk Cooling
Ice and Ice Cream Making, etc.

CONDENSING UNIT TYPE X

The Weir Type X Unit for Methyl Chloride or Freon F12 is supplied complete as illustrated. The condenser has ample capacity to act as a reservoir and no separate liquid receiver is necessary. This unit is ideal for use in the food industry and for milk cooling, ice cream manufacture and in small air conditioning plants.

Write for Publication No. ID. 136

G. & J. WEIR LTD.
CATHCART GLASGOW

Smooth as a stream

That's how confectionery flows along the production line when you install Jenner Conveyors. Speed can be adjusted to that precise point where you get maximum efficiency—no bottlenecks, no congestion, no waiting.

Jenner Conveyors also save labour—photograph above shows confectionery going straight from the machines to weighing section without any human help.

Jenner Conveyors save space, because they are specially designed for your factory layout. They travel up or down, round corners, along walls.

In other words, Jenner Conveyors pay for themselves.

LET *Jenners* HANDLE IT

You can get full details from:

A. & C. JENNER LTD., CLARENDON WORKS, MITCHAM, SURREY.

Telephone: MITcham 4044/5

A Sweeper to meet Food Factory Requirements

THE LEWIN UNIVERSAL BATTERY ELECTRIC SWEEPER

This new Lewin machine has been specially designed for Food Factory use, where absence of engine fumes is essential. Based on Lewin's long experience of Sweeper manufacture, the machine sweeps and collects any kind of refuse, indoors and out, wherever an even surface exists. A water sprinkler is fitted to keep down dust where necessary. The electric drive is from Traction Batteries of ample capacity.

AREA DISTRIBUTORS:

Greater London: Equipment & Engineering Co. Ltd., 2-3 Norfolk St., W.C.2. Lancashire/Cheshire: Sandon Motor & Eng. Co. Ltd., 45 Old Hall St., Liverpool 3. Northants/Bucks/Beds: Northampton Caravans Ltd., Kettering Rd. North, Northampton. Staffs/Salop: Motor Sales (Longton) Ltd., Church St. Stoke-on-Trent. N. Ireland: Stanley Harvey & Co. Ltd., Clarence St. West, Belfast. Scotland: J. Brockhouse & Co. Ltd., Livingstone St., Clydebank.

All other enquiries to Manufacturers

Lewin's long experience in the design and manufacture of Road Sweeping vehicles for local authorities in many parts of the world has been utilised in the production of this machine.

A BROCKHOUSE COMPANY

LEWIN ROAD SWEEPERS LTD.

VICTORIA WORKS · HILL TOP · WEST BROMWICH · STAFFS

CRODA GOOLE

FLAVOURING ESSENCE SPECIALITIES

by

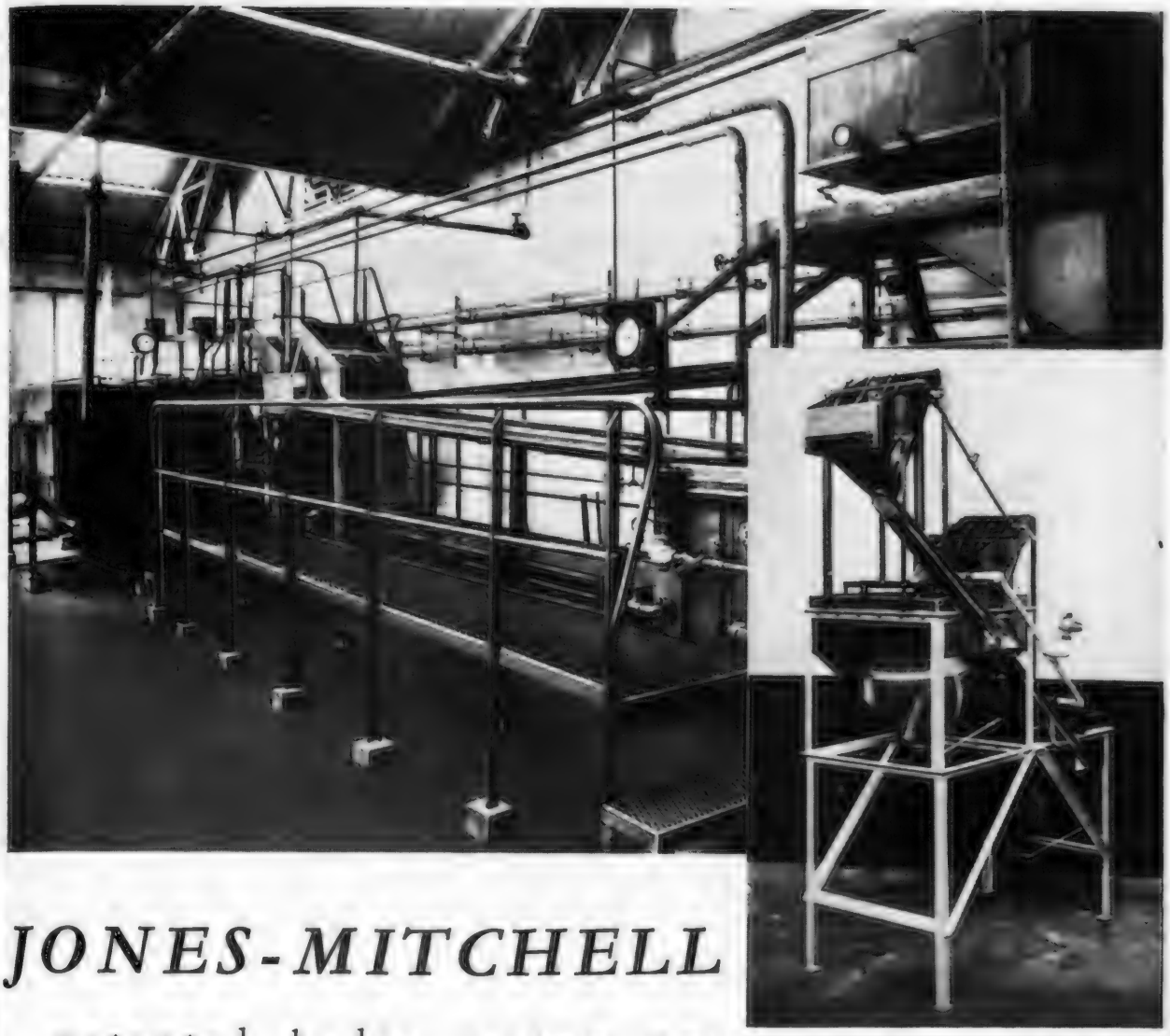
ESROLKO

DUBENDORF
SWITZERLAND

BURNT HAZELNUT
BURNT SUGAR
MECCA CREAM
RHUM
RHUM ETHER
RHUM OIL
RHUM CREAM

CRODA LIMITED

Administrative Offices CRODA HOUSE · SNAITH · GOOLE · YORKS
Telephone: SNAITH 77 (three lines) ALSO AT LONDON MANCHESTER BRADFORD



JONES-MITCHELL

patented hydro system pea and bean canning line

HYDRO FRESH PEA AND BEAN WASHING AND SEPARATING UNIT

This item forms one unit of our hydro fresh pea canning line which will be illustrated in a later issue of this journal. We shall be very pleased to forward further information regarding the fresh pea line in response to specific enquiries.

* A complete line without moving parts for processed pea and bean canning.
* Maintenance reduced to a negligible quantity.
* Splits, stones and loose skin and other extraneous matter automatically removed.
* The last word in efficiency and hygiene.
* Simplicity of operation.
* Floor space materially reduced.
* Can be arranged to fit into any existing layout.

MITCHELL ENGINEERING LIMITED

FOOD MACHINERY DIVISION, DEPT. G, 7, GOWER STREET, LONDON, W.C.1

Jan slung out the garbage can

And all his outmoded ideas about packaging. He'd tape everything from now on. No. He'd *Transotape* everything. That's it! He'd stop up that pilfering leak. He'd seal safer. He'd seal smarter.

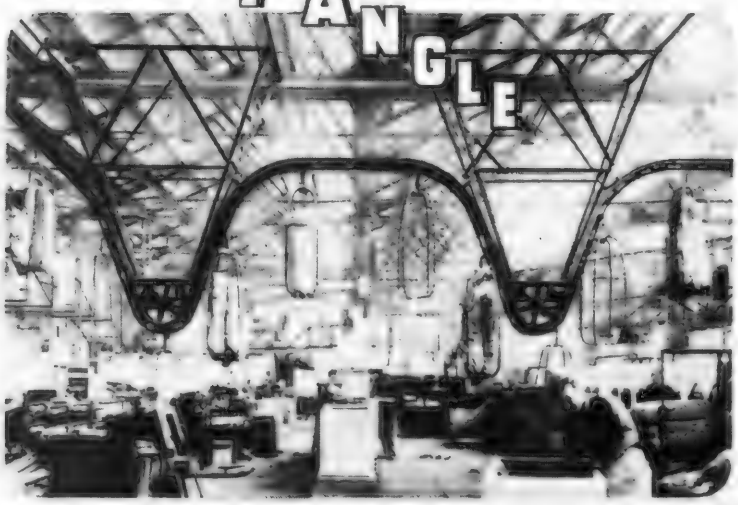
A smart feller is Jan . . . . . he became a Transotape man and has never looked back since!

Let's send a sample — may we?

JOHN GOSHERON
& CO LTD
GAYFORD ROAD
LONDON W12
Telephone SHE 3326

GOSHERON for TAPES

STEEPANGLE CONVEYING



The flexibility and adaptability of the Teleflex 'Dual-Directional' Chain Conveyor is exemplified in the installation shown above. The angle of rise and fall at the off-loading points is 70° from horizontal, and as can be seen, allows maximum value to be obtained from floor space.

For medium duty conveying specify the

TELEFLEX 'DUAL-DIRECTIONAL' CHAIN CONVEYOR SYSTEM

TELEFLEX CONVEYORS

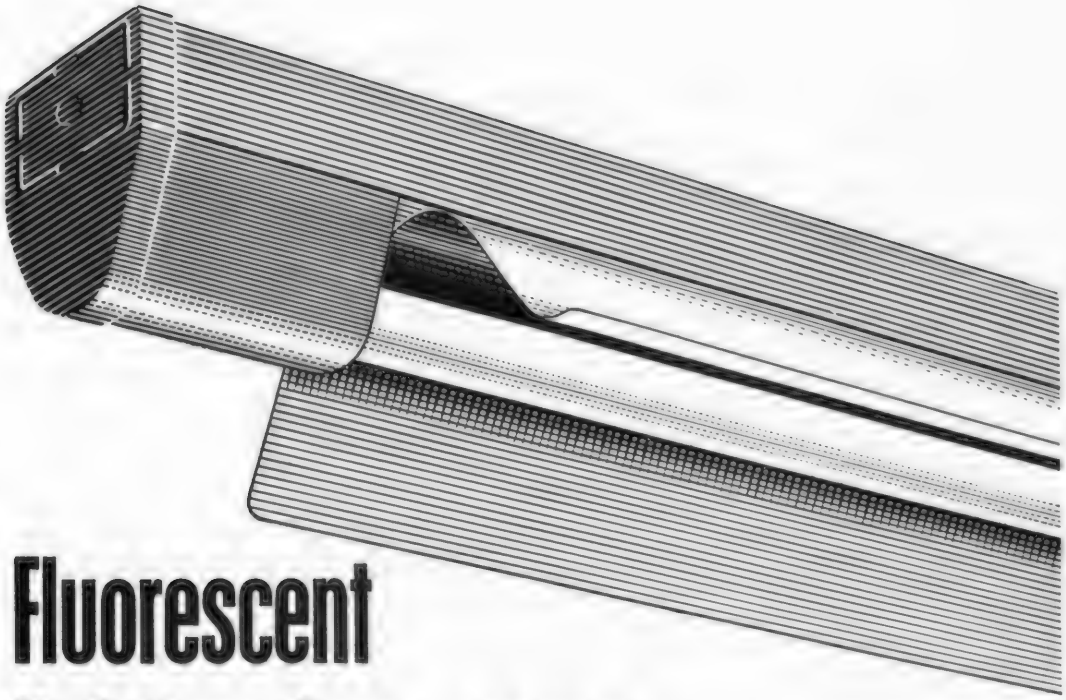
- SIMPLICITY
- RELIABILITY
- ECONOMY
- FLEXIBILITY

CONVEYING GLASS FIBRE WOOL

(By Courtesy of the Frigidaire Division of General Motors Ltd.)

TELEFLEX PRODUCTS LTD · CHADWELL HEATH · ESSEX

TELEPHONE SEVEN KINGS 5771 (7 lines)



Fluorescent lighting has never been so simple!

MUCH EASIER INSTALLATION & MAINTENANCE

THESE VERY robust new Mazda fittings set new standards of economy in installation and maintenance. The reflector illustrated is for use with a single Mazda 80 watt 5 ft. Fluorescent Lamp. Similar fittings are also available with or without reflector and for use with one or two 80 watt lamps. All these fittings incorporate the new BTH Choke which is virtually silent in operation but has no compound or other filling.

For leadership in lighting

say Mazda!

THE BRITISH THOMSON-HOUSTON CO. LTD.
Crown House, Aldwych, London, W.C.2

B T-H

M1350

Mazda F1150/1/8060

Designed for simplified installation by conduit, chain or BESA Box. Reflector slides off to expose detachable tray with auxiliary gear and lampholders ready-wired to one conneetor block.

Embossed end-plates interlock with adjacent fittings; knock-outs are provided for through wiring.

The fitting is of bonderised sheet-steel heavily stove enamelled in light stone colour and white. All holes in the metal are rubber-bushed.

Reflector can be supplied with or without upward light slots.

THE COMPLETE ANSWER TO THE NEW ACT . . .

Factories Act 1948 Section 6

You must comply with the Act—to YOUR advantage

Your responsibilities under Section 6 of the Factories Act, 1948, can be happily met by the installation of Tan-Sad Industrial Seating. There is a Tan-Sad chair for every seated worker, a chair designed to give a correct and comfortable sitting position whatever kind of work is being performed.

Tan Sad

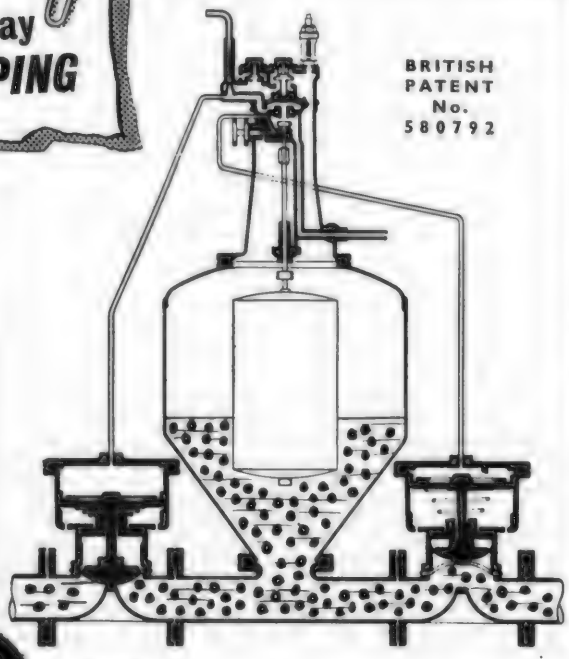
THE TAN-SAD CHAIR CO. (1931) LTD

Industrial Seating Specialists

AVERY HOUSE · CLERKENWELL GREEN · LONDON, E.C.1

Telephone: Clerkenwell 3192 3 *Telegrams: Tandomor, Smith, London*

pump foodstuffs the *NEW* way without *CRUSHING* or *PULPING*



ARE YOU TRANSFERRING FRUIT, VEGETABLES AND OTHER FOODSTUFFS IN YOUR FACTORY THE NEW WAY? Apricots, boiled apples and peas can be, and are being, pumped through glass pipes without damage by

GRESHAM'S "COMPRESSED AIR OPERATED" **Ejectopump**

No reciprocating or rotating parts, no glands, bearings or fine clearances. Purely pneumatic action. Note free passages through the pump. No crushing, no pulping, no trouble with fruit stones — the "EJECTOPUMP" takes the lot.

Send for List 70f.

GRESHAM & CRAVEN LTD

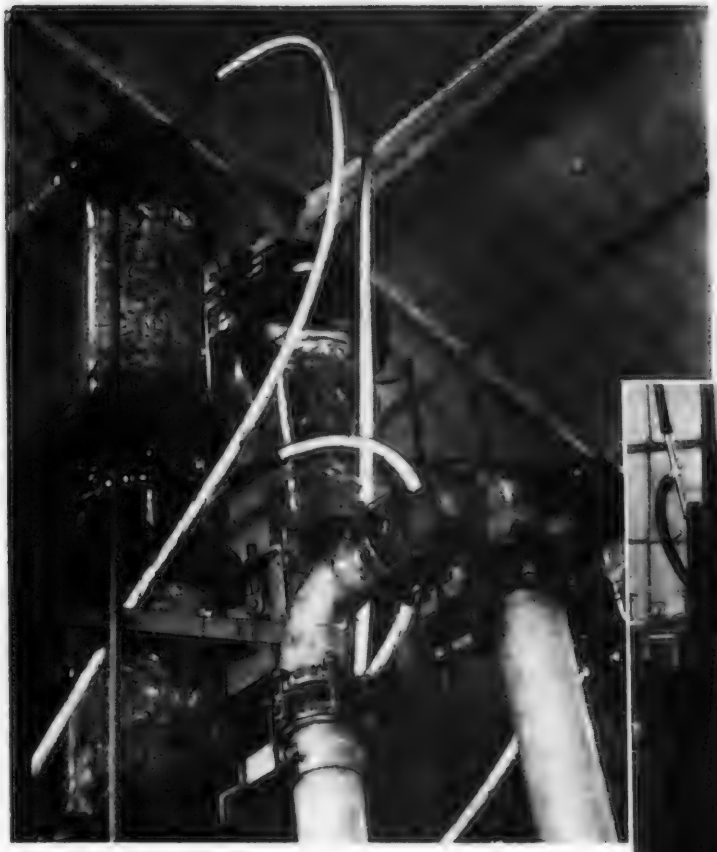
Dept. A D ORDSALL LANE SALFORD · MANCHESTER 5

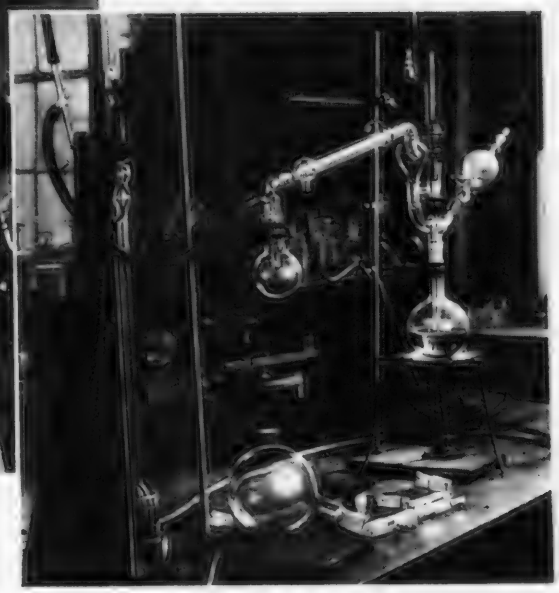
Telephone: DEAnsgate 6061/4 *Telegrams: Brake Phone, Manchester*

London Technical Representative and Selling Agent:

CONWAY ARNOLD, A.M.I.MECH.E., (Dept. A D), 13 SUFFOLK STREET, PALL MALL EAST, S.W.1

Telephone: WHItehall 2881/3 Ext. 12





"QUICKFIT" Laboratory and Industrial Glass

Top Left:
Section of Hydrochloric Acid Absorption Towers (photo by courtesy of I.C.I.)

Right:
Assembly of Utility Set for Reaction and Distillation in vacuo.

The "Quickfit" trade mark appearing on laboratory glassware or chemical plant is your guarantee of quality, reliability and precision. The "Quickfit" principle of readily available interchangeable parts is equally applicable in both cases. "Quickfit" products are backed by comprehensive painstaking technical service. Making a small laboratory component to special order, designing plant and erecting it on the production site, urgent repairs—all receive the thoughtful attention of the experienced, well-equipped organisation which made the name "Quickfit" known to discriminating chemists the world over. Remember that trade mark whenever you replace your stocks.

QUICKFIT & QUARTZ LTD.

INTERCHANGEABLE LABORATORY GLASSWARE
INDUSTRIAL PLANT IN GLASS

Orders and Enquiries to: **Dept. VM, "Quickfit" Works, Stone, Staffs.** *Phone: Stone 481*

HEAD OFFICE: 1, Albemarle Street, London, W.1

JOHN BRIGHT

AND BROTHERS LTD.

Spinners, Doublers and Manufacturers

Telephone: ROCHDALE 4141 (5 LINES) **ROCHDALE, ENGLAND** *Telegrams* "BRIGHTS" ROCHDALE

ALL KINDS OF

COTTON & RAYON FABRICS

FOR ALL BRANCHES OF THE

FOOD INDUSTRY

including

FILTER PRESS CLOTHS
and DUCKS for CONVEYOR BELTS

GLASSWARE *at its Best*

ALTHOUGH present conditions necessitate the limitation of designs and sizes we shall see to it that our customers have the best possible service.

Lax & Shaw Glassware is eminently suitable for the packing of food products and their full range includes something of interest to all food manufacturers.

Regd. Offices: **SCOTT HOUSE, 69 SOUTH ACCOMMODATION ROAD, LEEDS 10**
Telephone: LEEDS 21568 (3 lines)
Telegraphic Address: FEEDERS (PHONE) LEEDS

London Office: **ST. MARTIN'S HOUSE, 29, LUDGATE HILL, LONDON, E.C.4**
Telephone: CITY 7170

LAX & SHAW LTD

Air conditioning by BRIGHTSIDE

Process requirements are often so exacting in their demands that air conditioning in its fullest sense is the only solution.

Below is illustrated the plant chamber of an air conditioning system dealing with a section of a chocolate factory. In this case the atmosphere in large areas is controlled, and workpeople as well as the process benefit as the specified requirements approach the optimum for human comfort.

THE BRIGHTSIDE FOUNDRY & ENGINEERING CO. LTD. SHEFFIELD

and at BIRMINGHAM BRADFORD BRISTOL LIVERPOOL LONDON MANCHESTER NEWCASTLE PORTSMOUTH EDINBURGH GLASGOW BELFAST

BP 31

WIDE SCOPE OF ELECTRONIC MOISTURE MEASUREMENT

AGRICULTURAL SEEDS · BEAN FLOUR · MAIZE
WHEAT · RYE · WHEAT OFFALS
BARLEY W · ALGINATES
OATS · FLOU · GELATINE
SOYA FLOU · GLUE · RICE
TOBACCO · TE · COPRA
PEA FLOUR · ARDBOARD
COTTON · E ISINGLASS
FISH MEAL · ROVENDER
SEMOLINA · WOOD PULP
WOOD WOOL · WOOD FLOUR
GRAVY PO · OL · RAYONS
WELDING ROD COATINGS · PAPER · BRAN

To the speed and simplicity of the Marconi Moisture Meter is now added an ever-increasing scope — so that, no longer confined to a few applications, electronic moisture measurement is increasingly the short-cut to accuracy. With the calibrations now available, laboratory tests can be made on a wide range of substances and readings of actual moisture percentage obtained at a moment's notice. More accurate and more versatile than earlier moisture meters, Type TF 933A is temperature compensated, mains as well as battery operated and of compact, convenient design. Please ask for a demonstration.

The Marconi
MOISTURE METER

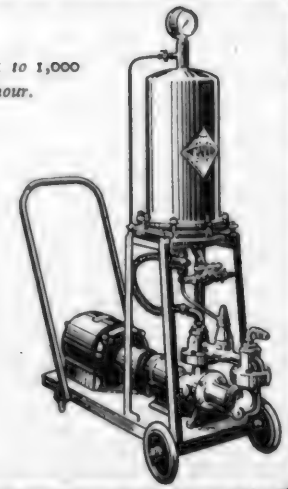
MARCONI instruments

MARCONI INSTRUMENTS LIMITED, ST. ALBANS, HERTS. **Phone: St. Albans 6161/7**

Midland Office: 19 The Parade, Leamington Spa **Northern Office:** 30 Albion Street, Hull **Export Office:** Marconi House, Strand, London, W.C.2

Appearance is Important

Sizes from 1 to 1,000 gallons per hour.



However carefully food products are prepared the customers' standard of perfection is appearance.
The scintillating clarity of Metafiltered fruit juices, syrups, mineral waters, vinegars, etc., is the hallmark of purity.

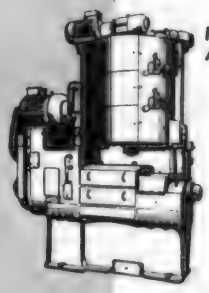
METAFILTRATION

PHONE: HOUNSLOW 1121/2/3
GRAMS: METAFILTER, HOUNSLOW

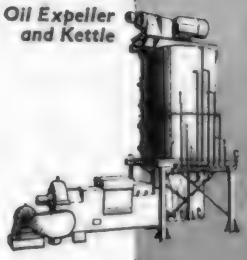
THE METAFILTRATION COMPANY LIMITED, BELGRAVE ROAD, HOUNSLOW, MIDDLESEX

ROSEDOWNS

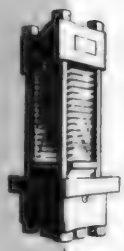
Machinery for the Production of Edible Oils & Feeding Meals



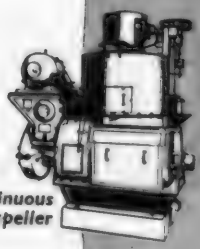
Maxoil Duplex Continuous Automatic Expeller



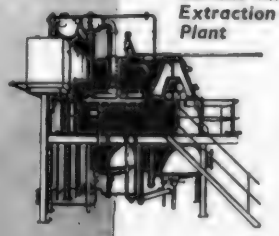
L.C. Oil Expeller and Kettle



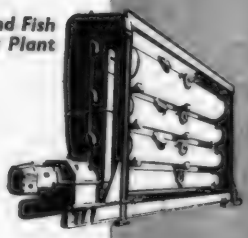
Anglo-American Hydraulic Oil Press No. 22



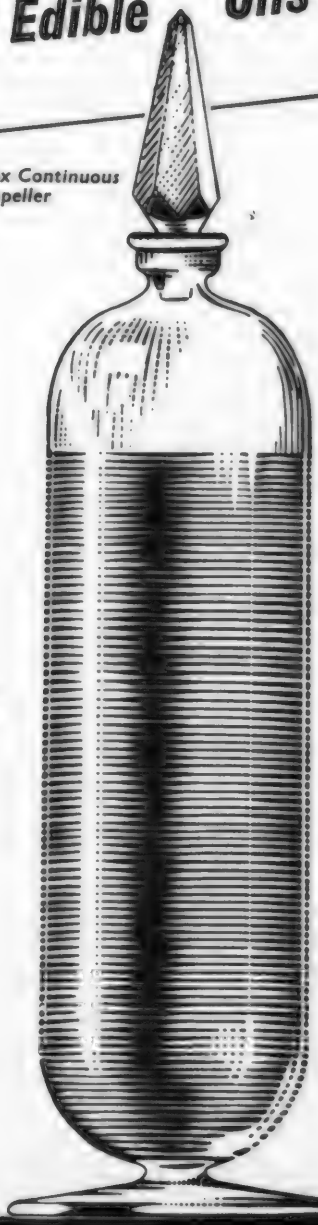
Maxoil Continuous Automatic Expeller



Solvent Oil Extraction Plant



Whole and Fish Treatment Plant



ROSE DOWNS & THOMPSON LTD

OLD FOUNDRY HULL ENGLAND

LONDON OFFICE 39 VICTORIA STREET SW1

The Pioneer Caramel Manufacturers

ESTABLISHED

1880

SATINEX CARAMEL

Your colour problem solved.

SATINEX CAN BE USED FOR THE COLOURING OF ALL TYPES OF FOODSTUFFS, IMPARTING A DELIGHTFULLY RICH AND APPETISING APPEARANCE

Write for sample to:

L. LAMBERT & CO. LTD.

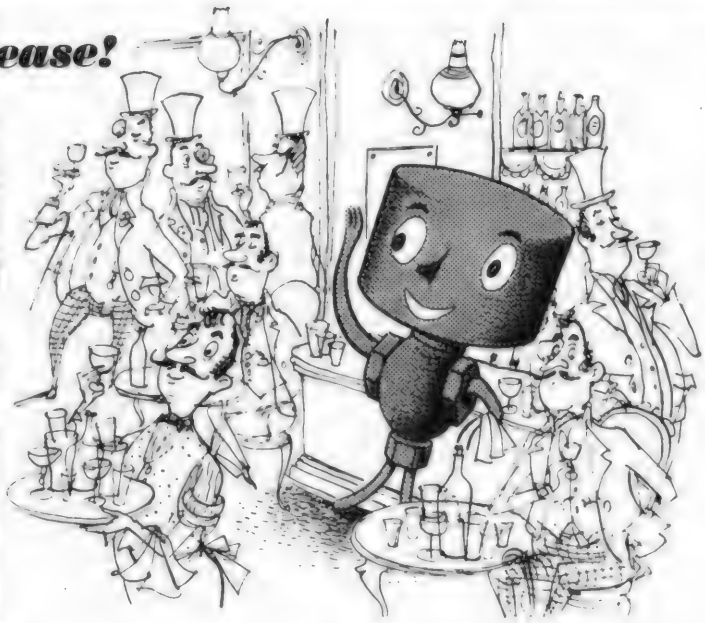
London Office:
4 PERCY STREET, W.1
Telephone: MUSeum 6102

Factory:
COLNE WORKS, UXBRIDGE, MIDDX.
Telephone: UXBRIDGE 95

Time Gentlemen Please!

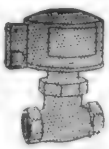
Though we may incur Colonel Chinstrap's undying wrath, we must confess that Magnetic Valves always close instantly, even on Cup Final nights and Hogmanay. (For his information, they open just as promptly.) While these qualities may not appeal to the Colonel, we find that engineers think that they're pretty good. We don't suppose the Colonel could care less, but in conclusion we must add that Magnetic Valves do not incorporate driving shafts, glands or stuffing boxes and high temperature operating coils can be fitted where necessary.

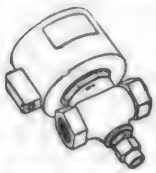
Send for descriptive brochure showing the full range of Magnetic Valves up to 12" orifice for AUTOMATIC or REMOTE control of water, steam, coal gas, oil, air and other industrial liquids and gases.



Magnetic "P" Type High Pressure Stop Valve
This valve is of the shut-off pattern and is suitable for passing water, air, saturated steam, oil, and gas at pressures from 10 to 250 lbs. per sq. in. The valve is of the pressure operated type, the solenoid operating a small pilot valve controlling the flow to the main valve which is opened by the pressure of the medium under control.

"A Flameproof solenoid housing, Buxton Certified, can be fitted where required."





THE
magnetic valve co.
LIMITED

SPECIAL VALVES DESIGNED if required
STANDARD VALVES DELIVERED ex stock.

28 ST. JAMES'S PLACE · LONDON S.W.1 · TELEPHONE: REGENT 7588 (*Manufacturers of Automatic Valves for over 20 years*)

For this cleanliness, too,

thank

Shell Chemicals

Strict rules of hygiene are essential wherever food is handled or processed. These rules are always much more easily enforced when working surroundings are bright and truly clean.

TEEPOL

is as valuable for general cleaning as for the cleaning of plant and equipment. For the washing of floors, walls, windows; for the cleaning of paintwork, linoleum, tiles: there is nothing to match TEEPOL in speed, effectiveness and economy.

You will be interested in "A CLEANER OUTLOOK"—a new publication sent free on request.

SHELL CHEMICALS LIMITED, Norman House, 105-109 Strand, London, W.C.2.
(DISTRIBUTORS)

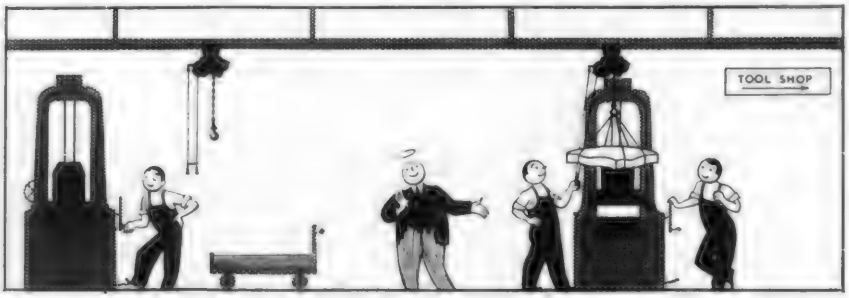
SHELL

"TEEPOL" *is a Registered Trade Mark*

F2

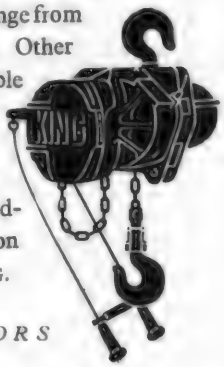
Everything happens in *some* factories!

Idle machines, *avoidable fatigue and accidents are part of the real cost of out-of-date handling. It tends to make its mark in the balance sheet when goods are humped and heaved about by hand.*



What a difference *when lifting and shifting are* **organised,** *part of a smooth production flow! Nearly always it means more production, less effort, lower cost per unit.*

HERE'S EFFORTLESS POWER to do your lifting and shifting. One man and a My-Te-Min can free two other workers for production jobs. These Electric Pulley Blocks soon repay their cost (from £69 upwards). Running costs are negligible. Maximum loads range from 400-3,600 lbs. Other blocks available up to 10 tons. For a My-Te-Min or full-scale handling installation consult KING.



KING

ELECTRIC PULLEY BLOCKS, CRANES, CONVEYORS
WRITE FOR ILLUSTRATED BOOKLETS

GEO. W. KING LTD., 6 WORKS, HITCHIN, HERTS. TEL.: HITCHIN 960. AND AT STEVENAGE

Ventilated Transport Trays

Measurement: 20" long; 15" wide; 6" deep.

Originally made to meet the exacting requirements of soft fruit transport, these one-piece pressed light alloy trays combine scrupulous cleanliness with robust strength and safe stacking facilities.
By mass production the price has been fixed at a level which demands comparison with existing wooden trays—dirty, costly in upkeep and heavy in use.
The special corrosion-resistant aluminium alloy used makes them ideally suited to a wide variety of uses in the fruit, meat, fish and bakery trades, and, as aluminium specialists, we shall always be happy to advise on your own particular problems.

Prices and illustrated leaflet on application.

The illustration shows the special stacking facilities and nesting features which ensure safe travelling under all conditions.

One of the wide range of

BRABY
PRODUCTS

FREDERICK BRABY & COMPANY LTD
FITZROY WORKS, 352 EUSTON ROAD, LONDON N.W.1 TEL: EUSTON 3456

OTHER FACTORIES AT: IDA WORKS, DEPTFORD, **LONDON** *S.E.8 • HAVELOCK WORKS AINTREE* **LIVERPOOL 10** *• ECLIPSE WORKS, PETERSHILL RD.,* **GLASGOW, N.** *• ASHTON GATE WORKS,* **BRISTOL 3** *• ALSO* **FALKIRK** *&* **MOTHERWELL**

OTHER OFFICES: 110 CANNON STREET, **LONDON** *E.C.4 (EXPORT) • QUEEN'S BUILDINGS, 10 ROYAL AVENUE,* **BELFAST** *• PALACE STREET,* **PLYMOUTH**

From the 1st ton of

STADEX sold in April, 1930, has grown a business which is now one of the largest manufacturers of Adhesives, Starches and Dextrines in the United Kingdom, covering practically every major industry where these products are in constant use.

We believe that our policy of a maintained standard of quality, competitive prices, and personal service to the consumer has been responsible for this progress and caused so many customers to "ANCHOR TO A STADEX PRODUCT"

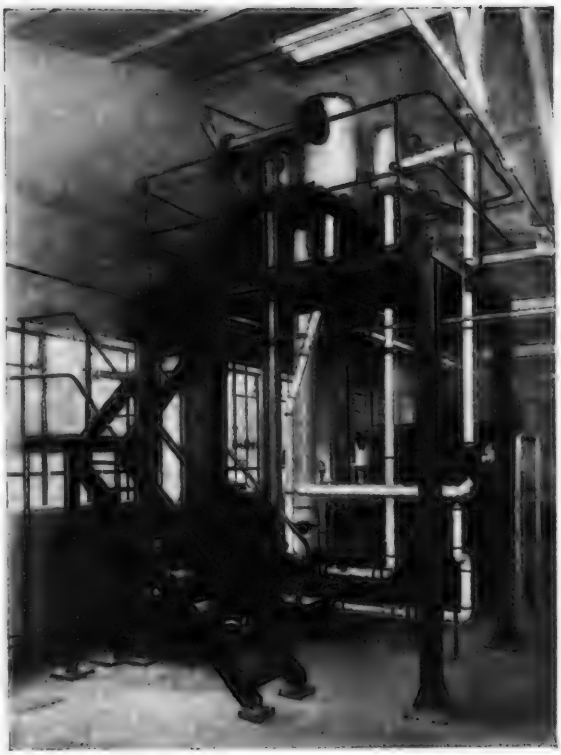
STARCH PRODUCTS LTD
OF SLOUGH

STARCH PRODUCTS LTD., STADEX WORKS, MIDDLE GREEN ROAD, LANGLEY, SLOUGH, BUCKS. Tel.: SLOUGH 25021 (4 lines)

Kestner
THE CHEMICAL ENGINEERS

EVAPORATORS *for the food Industry*

LIQUID CONCENTRATES
FRUIT SYRUPS
HEAT SENSITIVE PRODUCTS
CONDENSED MILK ETC.



By means of this specially designed Evaporator for the Food Industry all heat sensitive and delicate products can be concentrated quickly in a matter of minutes whilst retaining vitamins and flavour. This is of the utmost importance to those manufacturers seeking to market quality products. The Kestner patent Multi-Circulation Climbing Film Evaporator is ideally suitable for concentrating Orange Juice, Apple Juice and Rose Hip Syrup as well as for the continuous processing of Condensed Milk, Coffee Extracts, etc.

We shall be pleased to send full details on application

Kestner's THE CHEMICAL ENGINEERS

KESTNER EVAPORATOR & ENGINEERING CO. LTD. 5 GROSVENOR GARDENS, LONDON, S.W.1

Built like a watch!

THE B.J-D ATOMILL is a fine grinder capable of reducing most friable materials to 300 B.S. mesh products at varying rates of several hundredweights an hour. Yet, despite its sturdy frame, and bold appearance, the qualities of craftsmanship, precision engineering and high-grade materials are characteristic of an expensive watch. The B.J-D Atomill is built to last, and provide trouble-free service with an absolute minimum of maintenance.

It always pays to **consult** BJD

PLEASE WRITE FOR CATALOGUE No. G 1469 to
BRITISH JEFFREY-DIAMOND LTD., WAKEFIELD.

LONDON OFFICE: 15-17 CAXTON STREET, S.W.1
n.d./h.

When planning your factory floors specify

Stelcon....

STEEL CLAD FLAGS

or

ANCHOR STEEL PLATES

....for dustless, hygienic steel and concrete surfaces able to withstand the toughest of conditions

STELCON units are approx. 12" x 12" and therefore excellent for repair work as well as new work.
Your enquiries will be appreciated.

STELCON (INDUSTRIAL FLOORS) LTD · CLIFFORDS INN
LONDON, E.C.4 · Telephone: HOLborn 2916

EFFICIENT DISPERSION

THE SINGLE SERVICE VALVE

The product is forced under great pressure through a myriad of minute passages of the stainless steel wire valve—ensuring perfect homogenisation. The valve can be discarded at the end of each day's run, thus maintaining peak efficiency at an economic cost.

THE C.P. MULTI-FLO HOMOGENISER

A boon to the Food and Chemical Industries guaranteeing a uniform product with smooth texture at low working pressure. An invaluable addition to your present team of processing equipment . . . and delivery in a reasonable time.

Write now for details or visit our Showrooms at Mitcham Junction, Surrey

THE CREAMERY PACKAGE MFG. COMPANY LTD

Mill Green Road · Mitcham Junction · Surrey

Telephone: Mitcham 2981 Telegrams: "Scepyko, Mitcham"

FOOD MANUFACTURE

Vol. XXVII. No. 1 · Published Monthly · January 1, 1952

CONTENTS

	Page
Editorial	1
A New Whale Factory Ship	5
Commercial Production of Synthetic Vitamin A	8
The Milling Industry. *A. J. Amos, Ph.D., B.Sc., F.R.I.C.*	11
Rancidity in Stored Fish	16
Raising the Status of the Iced Lollie	17
The Manufacture of Maize Starch. Part III. *J. A. Radley, M.Sc., F.R.I.C.*	20
Automatic Control in American Food Plants. Part I. *Leo Walter and Jack Meyer*	23
Food Controls in Great Britain. Part V. *C. G. Daubney, M.Sc., F.R.I.C.*	26
A Survey of World Meat Production	30
Trade News	31
Information and Advice	41
Recent Patents, Trade Marks and New Companies	42

Published by Leonard Hill Limited, 17, Stratford Place, London, W.1. Mayfair 7383.

Subscription Rates: 1 year $6; 3 years $12; payable in advance

GELATINES

A bright sparkling jelly can only be made from a Gelatine of good strength, clarity and colour. All our grades are tested strictly according to the methods of the British Standards Institution and standardised to a definite specification.

Our Gelatines are also submitted to the most exacting laboratory tests to ensure complete freedom from harmful impurities.

OURY, MILLAR & CO LTD.
THAMES HOUSE, QUEEN STREET PLACE, LONDON, E.C.4.

Speed the Packing

OVERPRINT YOUR OWN

Labels
Tickets
Cartons
Tags etc.

Photo by Permission of: The Phoenix Telephone & Electrical Works Ltd.

Photo by Permission of: Johnsons of Hendon Ltd.

Photo by Permisssion of: East Kent Packers Ltd.

END WRITING BY HAND
RUBBER STAMPING
PRINTING DELAYS

Consider the large savings that can be effected by 'On the Spot' Overprinting by using a Dapag Machine. Any boy or girl in your factory can overprint all the details on to any quantity of your labels, tickets, tags, etc., within a matter of seconds. Thanks to the Dapag Quick-Setting Type method, the smallest quantities are produced as economically as the largest. Send for further details today.

Sales and Service available in all areas of British Isles

Dapag

OVERPRINTING MACHINES

DAPAG (1943) LTD., 23 HOLBORN VIADUCT, LONDON, E.C.1

Telephone: CITy 5373/4

FOOD MANUFACTURE

Vol. XXVII, No. 1 January 1, 1952

January 1952

ONCE more we have to look back on a year of frustrations, of disappointments, of apprehensions. Once more, the march of time brings us face to face with another year. In looking forward it may seem difficult to avoid pessimism, but at the end of the eighteenth century, a pessimist in high places declared that "when the American colonies gained their independence the sun of England will set and her glory be eclipsed for ever." Such a prophecy of ignominy was followed by one of the most glorious epochs in the history of the world.

The most optimistic among us will not deny that in the coming year the way will be hard. In the matter of food, prospects are not rosy. The repercussions of war and rumours of war press hardly upon manufacturer and consumer alike.

What say the optimists? Bertrand Russell has recently written: "A new happiness and a new freedom will be born and our scientific ingenuity will be devoted to our own happiness, not to our neighbour's sorrow."

To those who perceive no room for gracious living at a time when the world appears to be heading for disaster, the philosophers consider that faith in the future is the only creed. Millions of years ago Man's ancestors emerged from the primeval slime and he is not yet adult. We must console ourselves with the scant comfort that his evolution will proceed and that he has "a long and glorious future of increasing knowledge, increasing wisdom, diminishing subjection to poverty and disease, and a continually growing capacity for co-operation unhampered by the envies and hatreds which now fill the world with pain."

The time seems far off when "they shall sit every man under his vine and under his fig tree; and none shall make them afraid."

Amidst the multiplicity of counsels that have been offered, it is difficult to find words that can express the duty of the common man today. Perhaps the best that remain to him are those put forth by Longfellow in his *Psalm of Life*—"Learn to labour and to wait."

Seaweed Research

The Institute of Seaweed Research, a new company, has been formed in Scotland with 100 per cent. Treasury backing to continue the programme of work of the Scottish Seaweed Research Association, now dissolved. The latter had some private backing and did invaluable pioneer work which will be continued by the body in its new form. It will promote and conduct research of all kinds into types and quantities of seaweed, marine vegetable growth, and commercial use of such growth. The directors are Lord Bilsland, Hugh Rose, D. W. Low, Prof. E. L. Hirst, D. A. Francis, Prof. Cairncross, and Prof. Bennett Clark.

The current report of the body shows that 85 per cent. of the 5,300 miles of coastline has been surveyed. Of this 36 per cent. is probably capable of potential industrial development. This means a total potential of 10 million tons and a concentrated area of 4 million tons awaiting the solution of the harvesting problem.

Research has continued on the uses of laminarin, the seaweed starch; mannitol, from which alginic acid is derived; and fucoidin, a source of one of the lesser known sugars, fucose.

Processed Food Control

The extent of the efforts made by the food processor to ensure that the composition of his finished product is of the highest grade and quality is probably not realised by the average consumer, who philosophically accepts the fact that he is almost invariably obliged to relegate to the garbage can an appreciable percentage of the "fresh" foods he buys.

A paper presented by J. L. Heid at the 11th annual conference of the Institute of Food Technologists demonstrates the care that is taken in the control of the quality of frozen foods.

The task of the quality control technologist who selects the raw materials, and controls the processing operations by which acceptable and uniform packaged foods are produced, is not so easy as might appear at first sight.

THE EDITOR SENDS SEASONAL GREETINGS TO ALL READERS

The acceptability of frozen foods depends upon their appeal to the senses of sight, touch, taste, and smell, and numerous tests of an objective nature are necessary for their evaluation.

Other tests applied to the composition of citrus juice products include total soluble solids, citric acid, and volatile water-immiscible oils. Although the viscosity of concentrated juice is not commonly measured, it is of considerable importance in the design of equipment for handling the juice.

The determination of ascorbic acid in frozen citrus and other fruit products is of primary importance; it provides an index to the condition and maturity of raw materials and to losses during processing, and indicates the degree of success of processing methods.

Rate of flocculation or settling in citrus juices is measured to ensure against consumer complaints. Hydrogen-ion determination, among other tests, is routine at every stage of frozen citrus products manufacture and the measurement of ash constituents is a valuable control procedure for evaluation of quality and uniformity as well as source of raw materials. Such determinations may also furnish clues to substitution of less costly ingredients.

Resistance to deformation, penetration, and leakage may also be useful in evaluating quality.

The final aspect discussed by Mr. Heid is that of microbiological examination. Its check on success in cleaning fruit and equipment and avoidance of contamination during processing cannot be underestimated.

These are only some of the "counsels of perfection" which are the order of the day for the frozen food industry.

Our Daily Bread

Voluminous correspondence arising from a paper written by Sir Edward Mellanby has been running in the *British Medical Journal*. In his paper Sir Edward draws attention to the part the medical scientist should play in deliberations on the effect that the incorporation of chemicals in food processing might have on the nation's health. In letters to the same Journal, Dr. J. B. M. Coppock and Mr. S. W. Butterworth criticise some of the contentions contained in the paper. This covers a lot of ground, but Dr. Coppock and Mr. Butterworth join issue with Sir Edward Mellanby in the matter of bread volume. To put it in its shortest terms, he said that if bread is blown out with air, the slices will weigh less, and as the average family eats only as many slices of bread as can be covered by the ration of butter, margarine, and jam, they will get less nourishment.

Both Dr. Coppock and Mr. Butterworth contend that the arguments have been based on the inaccurate premise that bread is sold by volume, whereas it is sold by weight, and that the air content of a loaf tends merely to lengthen the slice somewhat, the girth remaining unaltered due to the restriction imposed by the tin in which it is baked. The controversy, in which Dr. Franklin Bicknell joined, is too long satisfactorily to follow here, but we feel that Dr. Coppock makes a good point when he says in effect that there is too wide a gap between the food scientist on the one hand, and the medical scientist on the other. In the same way that the medical scientist expresses the view that the food scientist does not in general grasp the significance or the difficulties and complexities of living processes, so also could the food scientist claim that the medical scientist is unaware of some of the controlling factors in food production.

The matter of the slice of bread savours of *reductio ad absurdum*, but has its more profound implications. It is when these controversies find their way into the popular Press, such as that on the matter of Agene, which recently filled its correspondence columns, that the layman must find himself in a state of bewilderment and wonder why the "doctors differ" so much.

Food Poisoning Increases

The Ministry of Health recently issued statistics for food poisoning cases in Britain for 1950 and once again it is revealed that there has been a formidable increase — 7,503 reported cases with over 17,000 people known to have been affected. When considering these figures, the fact that a new system of reporting cases came into operation during 1949 must not be ignored as this may well have accounted for some of the increase in the number of cases.

Actual figures in such a matter are not in themselves all-important; what matters most is the trend of events that they indicate. The outstanding fact is that 48 per cent. of all the cases were caused by processed or made-up meat foods such as pies, sausages, brawn, cold meats, stews, re-heated dishes, rissoles, and pressed beef.

There was a disturbingly high incidence of food poisoning outbreaks in school and works canteens; far more outbreaks occur in centres of this kind than in restaurants and hotels. Again the comparative figures may not measure the real truth quite accurately. It is far easier to investigate food poisoning cases in canteens, as the tracing of consumers is far easier; commercial establishments serve many more meals to people who cannot afterwards be traced. Even allowing for this bias, however, it cannot be denied that canteens are more likely to serve infected food than are restaurants, although this does not apply to many canteens to which no exception can be taken on the score of strict hygiene.

The greatest risk lies with the made-up meat dish,

mainly because such food is an ideal incubating medium for bacteria. Canteens in general work to a tighter economic budget. Is it not likely that they will as a result offer made-up dishes more frequently than the competitive and more price-varied restaurant; also that they will tend to re-serve such dishes too long after their initial preparation, thus increasing the risk of bacterial contamination?

The moral for public health officers is plain enough —look to the canteens. A drive to provide canteen managements with more information about the risks that are inherent in food preparation and handling is more likely to reduce the annual number of food poisoning outbreaks than any other general action. The public is often told to adopt a more critical attitude about the hygienic conditions of cafés and restaurants. More emphasis might be laid upon the need to be critical in canteens as well. There is some psychological difficulty here. The critic in the privately run restaurant is relatively free—the critic in a canteen run by his employer may fear to become known as a "trouble-maker." This not unnatural difficulty must be overcome.

Q Fever

A disease, already fairly well known in other countries, was found for the first time in Britain in 1949, according to the latest Medical Research Council Report. Q Fever, as it is called, dates back to 1937 when a doctor in Australia described the disease and gave it a name denoting its then mysterious nature.

It is now known to be caused by rickettsiae, small organisms bigger than viruses but not as big as the smallest bacteria. Although they originate in cattle, the rickettsiae do not cause even mild symptoms of illness in these animals. The fever mainly attacks workers in slaughterhouses or on dairy farms, the infection taking place through ticks, dust inhalation, and raw milk.

The two British cases of 1949 occurred in a London hospital, a doctor and a nurse being the sufferers. Their only common contact was a patient who had died in the hospital. He had been attended by the nurse before his death; the doctor had carried out the *post-mortem*. The patient had died from cancer but reconsideration of his symptoms suggested that while in hospital he had also had Q fever. If so, the original infection had occurred before his admission.

Enquiries at his home, in a Kentish town, revealed that his wife had been similarly ill with Q fever. A search for the local source of infection showed that three of the seven herds from which this family's raw milk supply was derived were infected with rickettsiae; later that rickettsiae were actually present in the milk from two of these three herds.

It is stated in the report that investigations are now being carried out jointly with the Ministry of Agriculture to find out the extent of infection among livestock in Britain. There is no suggestion that Q fever is prevalent or likely to become so, nor is raw milk the only likely cattle-to-man carrier of the causative organisms.

Even at this stage, however, the recent manifestation of the disease in Britain must be regarded as further evidence for the heat treatment of milk and of unsuspected dangers in consuming raw milk.

Germicides for Fish

Deterioration of fresh fish is caused chiefly by three factors: bacterial action, autolysis, and oxidation of oil. The first seems most important, especially in the case of non-oily fish. For this reason the South African Fishing Industry Research Institute has tried out dozens of germicides, in ice or as dips, in attempts to kill or retard the growth of surface bacteria on fish. Much has been discovered about this particular application of germicides. Some, it was found, merely mask the smell of putrefaction, others have undesirable flavours and odours of their own, others are corrosive to metals, and still others, such as nitrites, act only in acid conditions.

Among the germicides tried experimentally with some success were benzoic acid, sodium benzoate, hydrogen peroxide, lactic acid, chlorine compounds, nitrites, hydroxylamine, and sulphanilamide. Few were very effective in practice, however. The best seem to be chlorine compounds (*e.g.* 10 p.p.m.) and nitrites (*e.g.* 50-200 p.p.m.). Even at *p*H 7, ice containing 1 per cent. sodium nitrite improved the keeping quality of fish by 50 per cent. without affecting its flavour.

Any substance which can safely minimise bad smells should obviously be investigated. The operative word is "safely," and it is reassuring to note that the South Africans are exercising caution in the application of their experimental findings, and express themselves against the use of germicides in foods as a general rule.

The right order of experimental procedure should be: (1) toxicity of the substance proposed to be used, and (2) its inhibitive effects on putrefaction.

Norconidendrin—A New Antioxidant

In the course of an investigation of cottonseed and peanut oil preservatives, research workers at the Southern Regional Research Laboratories of the U.S. Department of Agriculture discovered a new antioxidant derived from a by-product of wood pulping. According to the Institute of Paper Chemistry, norconidendrin, as the antioxidant is called, was found to be a constituent of waste liquor from the pulping of western hemlock.

In order to promote the initial research, an Ameri-

can company provided the laboratories with the waste liquor from their hemlock pulping plant and from this a small quantity of conidendrin was extracted, purified, and tested for antioxidant activity. Results were disappointing, but continued research resulted in the production of norconidendrin, which is a demethylated derivative of conidendrin.

Tests showed that this new product compared favourably with the established antioxidants and as a result of further research it is evident that norconidendrin has many potential possibilities, among which may be included its use in peanut oil, cottonseed oil, and lard to prolong shelf life, as a means of improving the stability of butter-rich sweets, and as a constituent of wax paper coatings and other food packaging materials.

Because of these and other possible foodstuff applications, further work is to be put in hand to study the toxicology of the new product, and food manufacturers are warned to "go slow" until these investigations have been completed.

Although conversion of conidendrin to norconidendrin, involving solvent extraction and several crystallisations, is an expensive item, the final product is able to compete effectively on a price basis with a number of commercially available antioxidants.

Commercial production in America at the present time is on a limited scale only, but in view of the fact that aromatics from which many of the commonly used antioxidants are made are in short supply, norconidendrin will play an important part in easing the strain on these basic ingredients.

New Zealand Progress

The steady expansion of her food production appears more remarkable when it is realised that New Zealand already exports more food per head of her own population than any other country in the world. This is not being achieved by bringing large acreages of idle or marginal land into production; large land reserves of this kind are not possessed by New Zealand, and in the main she can increase her output only by farming her existing agricultural land more intensively.

Mechanisation has been a major influence. 4,000 tractors were in use in 1930—40,000 is today's figure. 93 per cent. of New Zealand's dairy herds are machine milked, as against 71 per cent. in 1930. The labour force has dropped by 8 per cent. since 1930, while the production of food has risen by 48 per cent. These figures tell their own story.

The latest technical development is the dressing of hilly pasture-land with applications of fertiliser by aeroplane. This is a steadily increasing practice and numbers of commercial operators offer farmers contract service. As phosphatic fertilisers are the main key to production from New Zealand soils, it is to be hoped that the world sulphur shortage, which severely restricts superphosphate production everywhere, but probably hits New Zealand hardest as she possesses no native sulphur and scarcely any sulphur-containing minerals, will not bring her expansion in fertiliser use to a standstill. Obviously any country which adopts such intensive farming methods cannot do so without replacing in the soil the extra plant-nutrients that bigger crops withdraw.

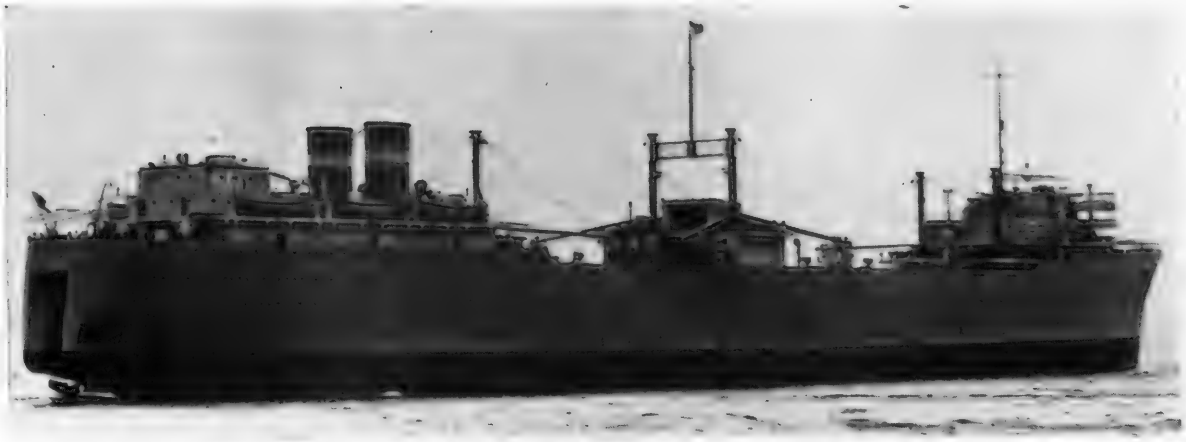
The Work of an Analyst

In his report for year 1950, the Public Analyst and Official Agricultural Analyst for the City of Leicester, Mr. F. C. Bullock, B.Sc., F.R.I.C., P.A.Inst.W.E., delivers himself of some philosophical reflections on some aspects of his work. He also records the now commonly accepted fact that, apart from isolated cases, the days of gross food adulteration are past. This he attributes mainly to the setting up on the part of food manufacturers of an ethical standard of business practice in which the older forms of crude adulteration have no place, with the result that the purchasing public is today getting a better deal.

Genuine mistakes, unavoidable accidents, misunderstandings, bad storage in retail premises, and sometimes a too hasty introduction of new scientific discoveries into food manufacture, all result in a hard core of "non-genuine" samples being found and reported against by Public Analysts. These cases may appear regrettable to some, but it is unlikely that they will ever be eradicated entirely, being a function of the human element. Indeed, says Mr. Bullock, the few non-genuine samples in a way serve their own very good purpose; they break up the monotony of examining a long succession of samples which turn out to be exactly what the analyst had expected before he began his investigation, and reward him with a few high-lights of interest. Thus they act as an incentive to regular conscientious work, and help to keep him on the alert—by experience he knows that he will not always search for irregularities in vain. He feels something of the same thrill in detecting a new method by which a common foodstuff has been ingeniously adulterated (having previously analysed several hundreds or thousands of the same material and not found anything amiss) as if he had forecast the correct results to win a football pool.

Finally, these odd occasions serve to establish contacts—if only by correspondence—between the analyst in his laboratory, and the manufacturer in his factory.

Official reports are rarely blithesome documents, and it is refreshing to find the "human touch" in one of them. And about those non-genuine samples, "it's an ill wind that bloweth no man good!"



A New Whale Factory Ship

The shortage of oils and fats has given a great impetus to improvements in the methods employed in winning these essential commodities from available raw materials, and to the development of new, and the expansion of existing, sources of supply. Particularly marked improvements have taken place in the treatment of the whale to obtain not only edible oils but also high vitamin content liver oils and high protein feeding meals. The latest factory ship to be designed and fitted out for this work is the 23,000 tons "Juan Peron" which has been built at Harland and Wolff's shipyards, Belfast, for the Compañia Argentina de Pesca, and carries on her factory decks the latest equipment for dealing with a greater proportion of the whale than has hitherto been undertaken, including special plant for treating the grax, lean meat, and the livers.

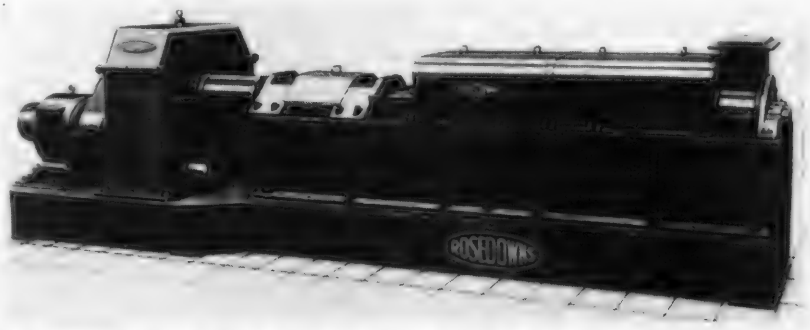
THE number of whales which can be caught during the catching period is limited by international agreement to a total catch of 16,000 blue whale units. One unit is equivalent to one blue or two fin whales, or two and a half hump back whales, or six Sei-whales. This limitation is accepted as a wise precaution, and the industry is, therefore, concentrating on methods of treatment which will extract many of the valuable commodities which can be obtained from the whale as space permits.

Whale Oil Production

The annual production of whale oil obtained in recent years does not equal the production of prewar years, when more ships were in action. Since the modern factory ship makes more use of the available resources it can be assumed that there is room for further expansion of the world's whaling fleet without danger to the whale population, but it is important that further expansion be integrated with developments towards the full utilisation of all the useful commodities which can be obtained from the whale.

Since whaling grounds are generally in remote areas, and, since processing of the whale must be carried out as quickly as possible after killing, the development of treatment methods is necessarily centred on the floating factory. This fact provides self-evident limitations to full expansion and owing to the confined space available and the need to conserve steam and power, certain processes have to be omitted or curtailed. In designing a new vessel the whole position must be reviewed in the light of market demands for the various products and the space and facilities which can be allocated to treating each commodity.

The equipment on board the "Juan Peron" has been designed with these factors in mind and provision is made to allow some variation in the processes as occasion demands. The vessel is capable of handling up to 2,500 tons of raw material per day, including 320 tons of lean meat, 200 tons of grax, and 15 tons of raw liver. A suitable section is devoted to the more traditional



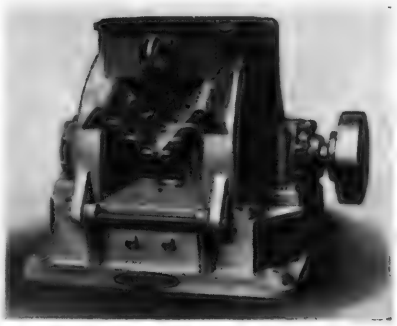
A continuous double screw press for materials with a high moisture content.

sources of oil, the blubber, the fat meat, and the bones, but this article is concerned with those sections which have developed more recently and handle the residual solids and entrained liquors from the blubber and fat meat sections, which are known as grax, the lean meat, and the livers.

The Grax Plant

A special contribution to the efficiency of the "Juan Peron" as a factory ship is effected by the grax plant, which reclaims valuable oil that would otherwise be wasted. The equipment includes special screens which can remove a certain proportion of the free liquor before the material is passed into low pressure liquor expellers. These expellers are designed to extract a large percentage of liquor from high moisture content materials.

The liquor, containing oil, is screened and the oil reclaimed by centrifugal separation and purification together with the oils from the blubber and fat meat. Although the expelled solid residues, which can be converted into a nutritious feeding meal, are discharged to waste because there is insufficient space available to treat them, the reclamation of the oil alone amply justifies the space devoted to this work; at the same time, provision is made to conduct experiments on the treatment of the solid residues from the oil expellers, and experiments will be conducted to lessen the amount of bulky plant now carried, thus giving space for additional plant.

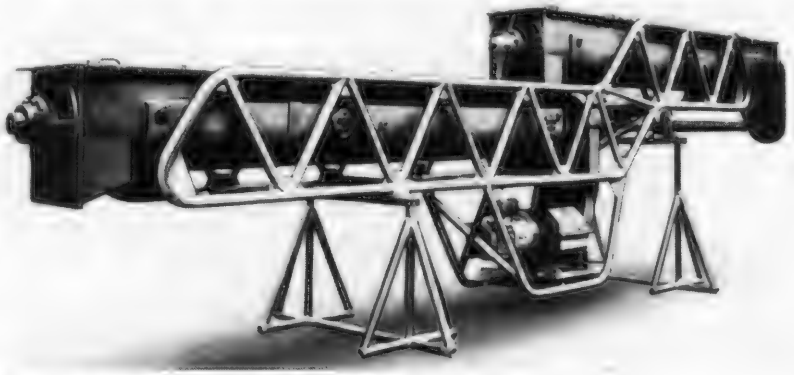


Hogger for reducing the raw whalemeat.

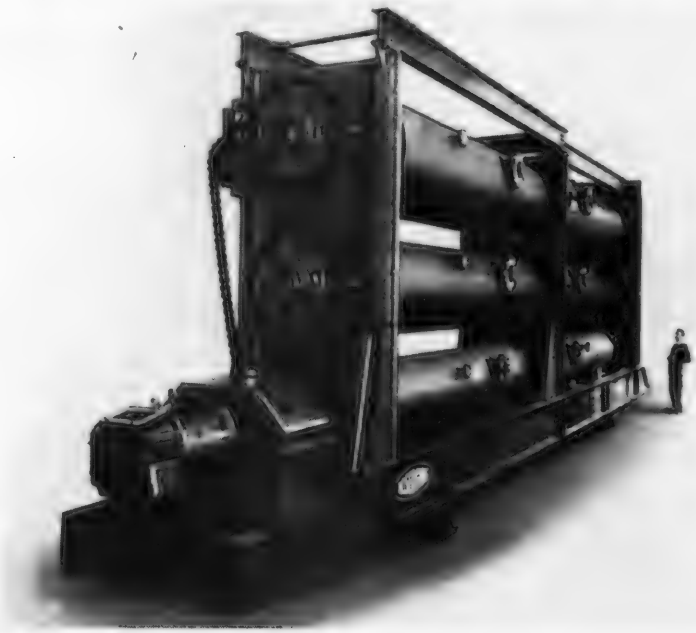
Lean Meat Plant

The lean meat can be treated on the "Juan Peron" to yield a feeding meal, and an oil which is equivalent in quality to the blubber oils. The meal produced contains a minimum of oil and has a high digestible protein content giving a very high value as feedingstuff. This plant includes equipment for preliminary reduction and oil separation, sterilising and drying, cooling, grinding, and bagging. The reduction is carried out in hoggers, which pulp the material to a consistency and which, after a further preliminary treatment, facilitate oil expression.

Magnetic belts are employed to remove the harpoon shrapnel and other tramp iron which may come in from the flensing deck. The reduced meal is cooked in special treatment tubes, before it is fed to vibratory screens and low pressure expellers of the type used in the grax section.



Treatment tubes for the preliminary processing of whalemeat.



Drying tubes for whalemeat meal.

Oil Reclamation

Oil, blood, lymph, and water are removed from the solids by the expellers and vibratory screens; the oil is reclaimed from these liquors by screening, separating, and purifying. The removal of the liquors not only recovers valuable oil previously lost, but also achieves considerable steam and power economy in the drying of the expelled solid residues which is carried out, after sterilisation, in tubular vacuum drier units.

After drying, the hot meal is passed through cooling tubes which bring it to a condition

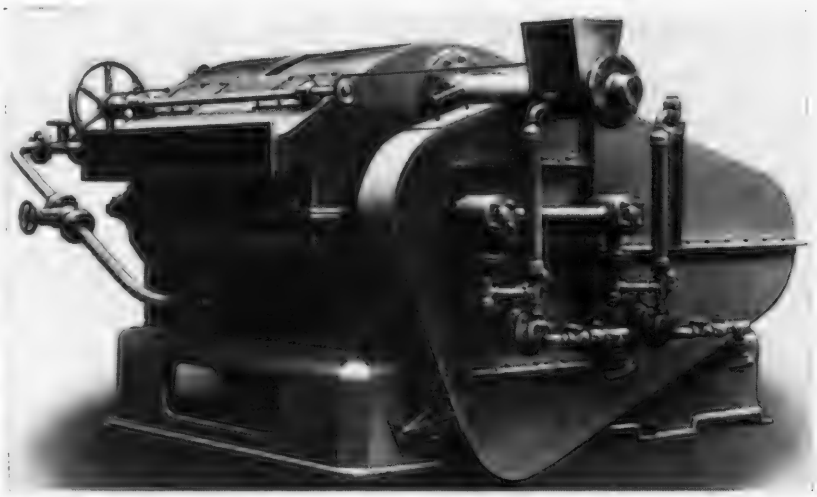
which will permit efficient grinding and bagging. As a safety precaution the cooled meal is passed over magnetic belts before passing to the combined grinder and cyclone unit.

Liver Plant

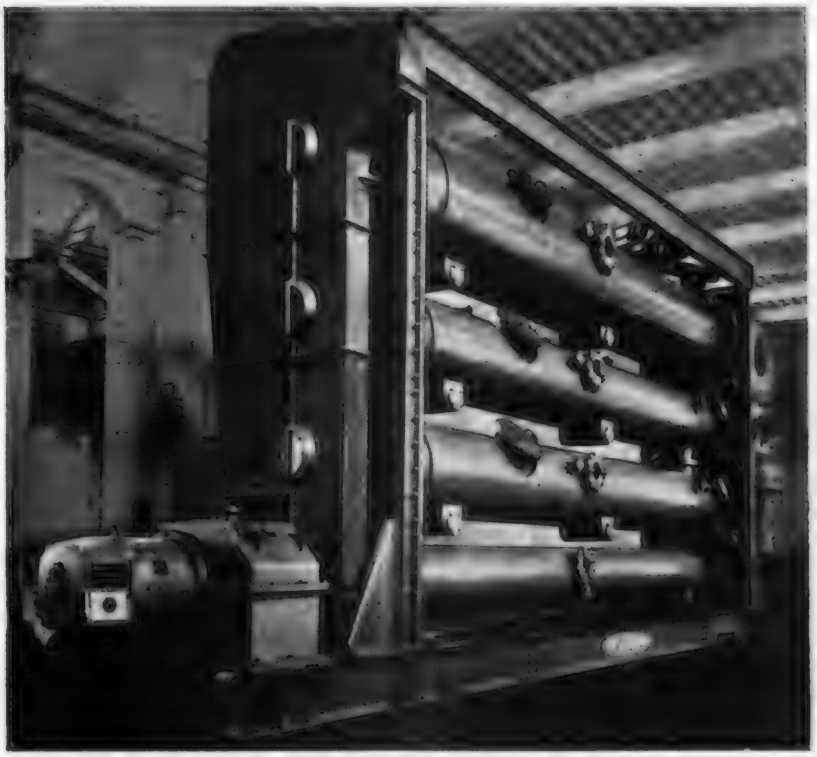
The valuable liver oils with a high vitamin A potency are recovered by solvent extraction, the residual solids forming a valuable feeding meal with a high riboflavin content. Because of the value of whale liver oil, great care is taken to obtain the maximum yield, to prevent oxidation of the oil with a resulting loss of vitamin A content, and to avoid wastage at any point in the process.

The initial operation consists of mincing the raw liver, then flaking it, and reducing the moisture content before the oil is extracted. Flaking is carried out in a coagulating chamber, and drying and cooling is provided by a horizontal tube unit.

The oil is extracted from the dried and cooled liver flakes in a batch solvent extraction plant, using trichlorethylene as a solvent which is reclaimed from the resulting mixture of oil and solvent by distillation, measures being taken to reduce losses to a minimum. Trichlorethylene is used because it is non-inflammable, but precautions have to be taken to neutralise any hydrochloric acid which may form during the reclamation of the solvent or in storage. The solvent-free oil is filtered and stored in sealed drums for further processing on land; the extracted meal is dried and cooled, and requires no grinding before weighing and bagging.



After the initial operation of mincing has been carried out, the raw liver is flaked in the coagulating chamber.



Drying and cooling tubes for whale livers prior to solvent oil extraction.

Importance of Conveying Methods

In the foregoing systems particular attention has been paid to conveying and elevating methods for the different materials which are handled during the process. This is important since, at certain stages, the materials handled do not lend themselves readily to normal methods of transportation. Full use has been made of the space available, and economies in steam and power, operation, and maintenance have all received careful consideration by the designers.

A Dual-purpose Tanker

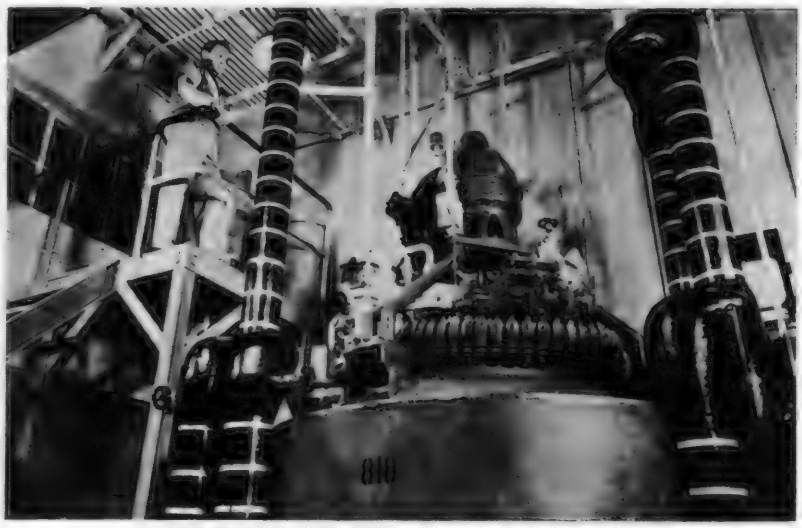
Some of the unique designs incorporated in this vessel arose from the fact that as a tanker she will carry light petrol spirit. This she will undertake at first because the fleet of whale catchers required to enable her to operate as a factory ship is not yet built. Thus, the "Juan Peron" will not undertake her proper duties until next season, but she may also be used as a transport vessel for the products from other vessels in the whaling grounds. This would assist her crew in obtaining experience of the conditions under which they will subsequently be required to work.

ACKNOWLEDGMENT.—Thanks are due to Harland and Wolff, who built the "Juan Peron," the *Compañia Argentina de Pesca*, the owners, and to Rose, Downs and Thompson, Ltd., makers of the plant installed, for supplying the photographs, and for permission to use them.

Commercial Production of Synthetic Vitamin A

FOR the first time, synthetic crystalline vitamin A is being produced on a commercial scale by Chas. Pfizer and Co., Inc., at Groton, Connecticut, U.S.A.

New manufacturing techniques, using this highly purified material, have resulted in the development of products having a very high degree of adaptability to varying processing conditions. Thus, vitamin A palmitate and a dry crystalline vitamin A acetate stabilised are now available. The latter material, a dry, free-flowing, stable product, makes possible the incorporation of vitamin A in tablets and also the fortification of dry foods. Since the synthetic vitamin A has no fishy odour or flavour, its use in pharmaceutical and food products is particularly advantageous.



The condensation of formaldehyde and acetone takes place in a series of reaction vessels similar to that shown here.

Raw Materials

Although the raw materials for the production of synthetic vitamin A are simple and readily available, the chemical reactions involved are complex.

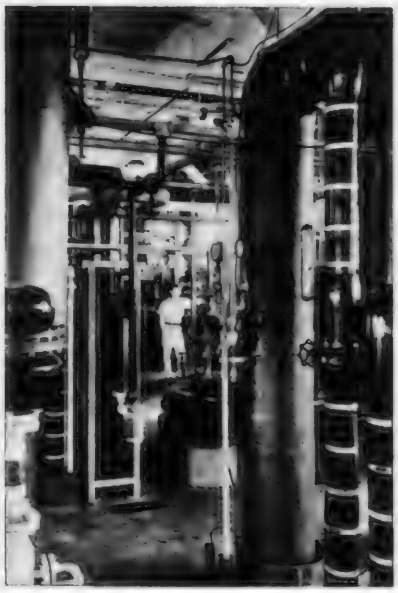
In brief, the complex molecule is built up in a 12-step preparation using citral from lemon-grass oil as the basic starting material. A series of condensation reactions convert this product to β-ionone and subsequently to a C-14 aldehyde. Concurrently, acetone and formaldehyde are condensed together and converted to methyl vinyl ketone, which is then reacted with acetylene under a slight pressure to provide a highly unsaturated methyl pentol. The C-14 aldehyde as well as the methyl pentol are carefully purified by distillation and the pure products then joined together by means of a Grignard reaction to form the basic structural skeleton of vitamin A.

Subsequent steps in processing are primarily devoted to the production of a highly pure crystalline vitamin A acetate or other forms of the vitamin derived from the acetate.

One step during the production of the C-14 aldehyde.

Design of Equipment

Because of the complexity of the reactions involved, a considerable amount of engineering detail was necessary in designing this plant. Equipment is varied. Glass-lined reaction vessels predominate, although in certain cases stainless steel is used. Most of the piping which carries the chemicals is of stainless steel. Packed stainless steel fractionating columns, the highest 30 ft., provide distillation capacity. Certain products which cannot be conveniently handled at atmospheric pressure are distilled at vacuums of 10 mm. Hg and below. These vacuums are obtained by the use of both oil pumps or steam ejectors. Since much of the processing is carried out in the cold, adequate refrigeration is required. High-speed ammonia compressors are used to provide the primary coolant with either brine or cold water piped to various sections of the plant.



Left: **The control panel for reaction of methyl vinyl ketone and acetylene. The reaction chamber is behind the steel partition completely isolated from the area where the operator works.** *Right:* **An interior view of the vitamin A plant showing the complexity of the installation.**

Since cooling requirements may vary, a completely flexible system has been provided by using separate heat exchangers for both brine and water, manifolding ammonia to each exchanger as required.

Owing to the presence of the high degree of unsaturation in the molecule, vitamin A tends to decompose when in contact with air, undoubtedly the result of peroxide formation. Thus, vitamin A must be protected from air during the processing, and for this reason nitrogen lines are available throughout the plant. To provide maximum efficiency in operation, nitrogen headers carry approximately 100 lb./sq. in. and reduction to operating pressure is accomplished at the individual units. Liquid nitrogen deliveries are made by tank truck and transferred into a central storage system.

Acetylene Reactions

The use of acetylene under pressure in chemical operations was formerly considered hazardous and impractical. However, from the work of Reppe in Germany, which has been continued and expanded by various laboratories in the United States, have come certain principles and techniques for such reactions. Thus, at Groton, the steps involving acetylene are handled in a specially designed outside room separated from the operator and other processing by a concave head of special construction to provide the necessary protection in case of accident.

Interlocking controls extend to the operator's station, and a system of vents and pressure relief valves has been provided so that it is unnecessary to enter the reaction area when a potentially hazardous situation might exist.

Vitamin A acetate as produced in this plant has a minimum potency of 2,700,000 U.S.P. units per g. Unfortunately, while this product is ideal from a purity standpoint, the sensitivity towards oxygen precludes usage under normal processing conditions. Therefore, other more practical forms are necessary. Oil-soluble, synthetic vitamin A palmitate of high purity is prepared from the acetate and is available in two forms:

1. Synthetic vitamin A palmitate containing 1-2 per cent. antioxidants —potency at least 1,600,000 U.S.P. units per g.
2. Synthetic vitamin A palmitate in corn oil containing antioxidants and standardised at 1,000,000 U.S.P. units per g. for convenience.

In addition the company has developed a unique dry form of crystalline vitamin A acetate which is stable and lends itself readily to processing procedures. In this patented process vitamin A acetate is embedded in a gelatin matrix. Contact with air is prevented and stability hitherto unknown is attained.

For example, crystalline vitamin A acetate stabilised retains 90 per cent. of its potency over a 42 day test period at 45° C., while the pure compound retained only 34 per cent. of the original potency at 25° C. over the same test period even when blanketed by an atmosphere of nitrogen. The granules have a potency of 500,000 U.S.P. units per g. and are available in various sizes.

Future Articles

ARTICLES to be published in forthcoming issues of FOOD MANUFACTURE will include the sixth article in the series "Food Controls in Great Britain," by C. G. Daubney; the second part of the article "Automatic Control in American Food Plants," by Leo Walter and Jack Meyer; a fully illustrated article describing the factory of one of the largest soft drinks manufacturers; a review of progress in the canning of fishery products; and progress articles on the vitamins, baking, packaging, and confectionery.

Food Factory Law

THE fifth edition of the well-known standard legal work* by H. Samuels, M.A., has just been published. The first one appeared in 1937, and the others have been issued at intervals of from one to four years. Each of the new editions was imperative: the law had to be defined as it was at any given time, lest those who use the work be misled.

Therefore the book is in itself an organic growth, but some may feel that the time has now come when no further new editions should be published, and that the author might at some future time make a digest of the law affecting factories as it stands then, and present us with a clear-cut summary of the whole—just as he presented us with such a summary in his first study, 14 years ago. It ought to be possible now to reduce the 700 pages of the book to almost half that number.

Even so, the value of this new edition cannot be questioned. It is as indispensable a part of the factory set-up as a first-aid outfit. Much of the difficulty of "finding what you want" is minimised by the book's system of indexing. The food manufacturer, for example, might ignore the lengthy clauses of the Acts and Statutory Instruments which bear upon food factories and turn at once, *via* the index, to the interlocking notes which apply to his particular kind of factory. Thus, although there are only two general entries for food, as many as 54 entries apply to various kinds of foods, under such headings as Biscuits, Bread, Butter, Cakes, Cheese, Cream, Fish, Fruit—and so through the alphabet; under these headings will be found all the relevant facts, ranging from the hours that may be worked to the layout, etc., of premises.

Next to be studied are the author's notes on a variety of Court decisions which have been given on the latest Factories Act —that of 1948. Although the 1948 Act was dealt with in the fourth edition, these decisions have all been given since that edition appeared. They will therefore be (some of them, at least, and to some readers) new material, for few laymen have either the time or opportunity to acquaint themselves with the bearings of all the legal rulings which affect their businesses. Knowledge of the details of even one such case may show the red light to an employer concerning something that he is doing, or failing to do, in his organisation, and enable him to steer clear of a brush with the law —an avoidance which in itself might mean a saving of a good deal more than the cost of the book.—C. J. S.

* *Factory Law.* By H. Samuels, M.A. Fifth edition. Pp. xxviii+719. Stevens and Sons, London. Price £3 3s. net.

All About Vitamins

A REMARKABLE little book* containing in less than 250 pages, many of which are taken up by photographs, diagrams, and references to the literature, the essential facts about the biological properties, clinical importance, chemistry, function, and methods of assay of every known vitamin has recently been published. This incredible feat has been accomplished without stooping to that reprehensible practice of debasing the English language by the use of a style that has aptly been termed "telegraphic."

Obviously to achieve this the author had to sacrifice a good deal that might have interested some of his potential readers. He has selected for omission, probably wisely, since the book is mainly concerned with human and animal nutrition, all reference to the important part played by members of the vitamin B complex in the nutrition of micro-organisms, and he has in fact dealt very briefly indeed with those vitamins that are of doubtful significance in human nutrition.

Again, the chemistry of the vitamins is for the most part restricted to structural formulae without attempting to explain how these were arrived at or how the molecules have been synthesised.

The emphasis throughout the book is on the importance of vitamins in human nutrition, on the nature of the clinical and biochemical lesions that make them important, on their assay and distribution in foodstuffs, and on the quantitative requirements and curative dosages for humans. There are three useful appendices in which the properties of the most important vitamins are summarised and in which the more important sources of these vitamins are tabulated.

For the student requiring further information there are good bibliographies at the end of each chapter and a general bibliography at the end of the book. The illustrations—many of them of cases of classical vitamin deficiencies—are apposite and on the whole informative.

This is a book that can warmly be recommended particularly to students of biochemistry, medical men, and dietitians; indeed it may be recommended to any non-specialist who may come into contact in one way or another with vitamins and who requires a lucid, succinct account of the essential facts about them without a lot of confusing detail.—F. A. R.

* *Vitamins. A Digest of Current Knowledge.* By Leslie J. Harris, Sc.D., D.Sc., Ph.D., F.R.I.C. Pp. xii+244. J. and A. Churchill, London. Price 15s.

Cider and Fruit Juices

MACERATION and defecation in cider making as they affect the pectin and nitrogen contents of apple juices are discussed by Mr. Beech and Dr. Challinor in the 1950 Annual Report of the Long Ashton Research Station.

Other papers of interest to fruit juice manufacturers are those concerned with the mechanism of the control of fermentation of ciders by centrifuging by Mr. Burroughs and Dr. Challinor, an investigation on the yeast flora of Kingston Black ciders carried out by Prof. Barker, and the effect of fruit storage on apple juice processing by Miss Kieser and Dr. Pollard, who, in conjunction with Mr. Timberlake, have also contributed a paper on the effect of manurial treatment on the composition of blackcurrants.

The Milling Industry

Progress in 1951

A. J. Amos, Ph.D., B.Sc., F.R.I.C.

"Familiarity breeds contempt" is an adage often applicable to the consumers' attitude toward a staple food. Except when the canine hysteria-producing property of a flour improver receives exaggerated publicity, or speculation is aroused by lurid reports of "madness bread" in a French village, the average consumer takes his "daily bread" for granted and does not realise the unceasing care and constant attention which are given to the daily conversion of wheat into flour so that the baker is provided with a raw material suitable for his breadmaking operations.

THE task of the British miller has always been an exacting one, demanding a wide experience of the wheats from most parts of the world, but today it is even more difficult because he is unable to choose his wheats and is obliged to mill to a prescribed, and still high, extraction. Despite these handicaps, however, the milling industry has maintained its interest and pride in technological skill and this fact, together with the good work of the baking industry, is the reason why a daily loaf of acceptable quality makes its appearance at our tables.

The Miller's Wheat Requirements

Britain has added appreciably to her pre-war acreage under wheat but even today she is obliged to import 70 per cent. of her wheat requirements. This need to rely so much upon wheats from overseas has made the British miller pre-eminent in his knowledge of the qualities of wheats from most countries of the world and in his ability to blend these wheats to the best advantage. Wheat grown in Britain is mostly very weak and not suitable for bread production; the British miller's first need, therefore, is a supply of strong proteinous wheat which he can use to "carry" the weak native wheat and thus arrive at a mixture of suitable strength.

In addition to the strong wheat, he will need also wheat of medium strength which he can rely upon as a "filler," that is, as a wheat which, although not able to carry weaker wheats, nevertheless requires no support itself and is thus suitable for admixture with the basic Manitoban/English blend. Wheats of medium strength and strong wheats are not, however, the only types imported; some weak wheat is bought overseas and may be used as a component of a bread flour grist or as a constituent of a blend for the production of "M" flour, that is, flour for purposes *other* than breadmaking.

Evaluating Types of Wheat

In order that he may use these various types of wheat to the best advantage and may be reasonably certain that his proposed blend will furnish a flour possessing characteristics suitable for the purpose in view, the British miller must be acquainted not only with the general nature of each type of wheat but preferably with the properties of the actual consignment which he will be called upon to use. This specific knowledge, as opposed to the more general knowledge, is important because the analytical data and the protein characteristics of a given type of wheat may vary widely from season to season, owing to differences in the weather conditions operating during the growing and harvesting periods.

The information which the miller requires, if he is to make the best use of the blending potentialities and the baking quality of a wheat, is obtained by subjecting the wheat to analytical and also to physical tests which enable certain of the properties of the protein to be measured.

The main analytical tests are the determination of protein and of diastatic activity. The measure of the latter property is recorded as the "maltose figure" of the wheat and is a measure of the amount of maltose which is produced from the *wheat's own starch* when flour from the wheat is incubated with water under certain standard conditions. If the diastatic activity is to prove satisfactory during dough fermentation, the maltose figure of a wheat should be greater than 1·5, and preferably in the region of 1·8-2·0.

The physical tests to which wheat may be subjected vary in scope according to the instrument by means of which they are applied. In the author's laboratory the Chopin Alveographe is used and numerical assessments of the stability and strength of the protein are recorded; a breadmaking flour would furnish a stability figure in the region of 60-75 and a strength figure of 45-55 on the empirical scale employed.

Wheat Importations

The bulk of the wheat imported during 1951 was Manitoban. Both the Atlantic and Vancouver

TABLE 1

AVERAGE DATA FOR THE 1951 ARRIVALS OF MANITOBAN WHEAT

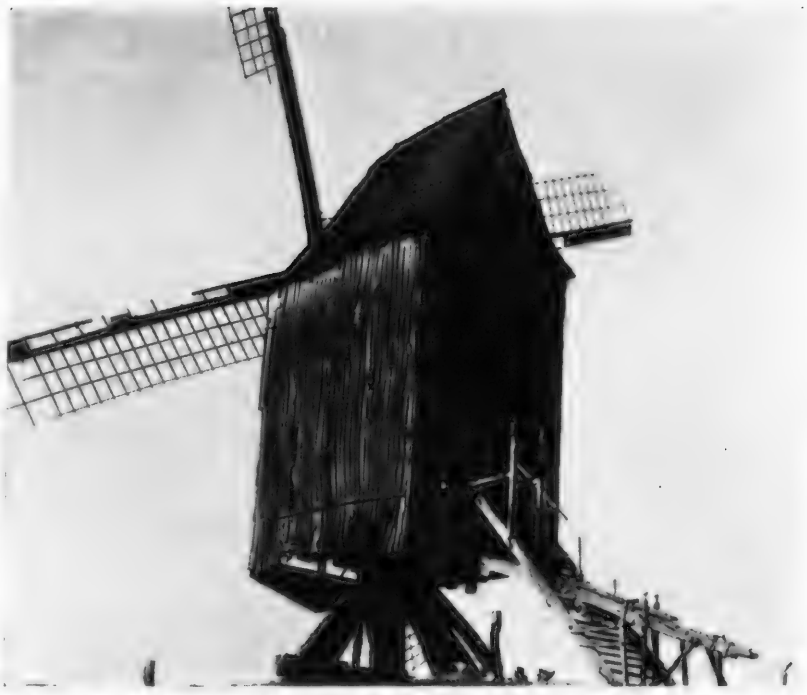
	Protein Content per cent.	*Maltose Figure*	*Stability*	*Strength*
No. 1 Atlantic	13·13	1·97	95	70
No. 2 Atlantic	13·17	1·97	89	67
No. 3 Atlantic	12·67	1·86	90	63
No. 4 Atlantic	13·52	2·58	99	66
No. 5 Atlantic	13·25	2·29	110	65
No. 1 Vancouver	12·79	2·03	84	62
No. 2 Vancouver	12·94	1·93	84	62
No. 3 Vancouver	13·35	1·91	93	65
No. 4 Vancouver	13·22	2·18	103	67

varieties were received and they covered between them Grades 1 to 5. There was little to choose between the Atlantic and Vancouver varieties of Grades 3 and 4 in protein characteristics and these wheats possessed useful strength and stability. Their proteins were not so springy and pleasing as those of the two top Grades but nevertheless they were better balanced and more satisfactory than those possessed by these Grades in some seasons.

The No. 1 and No. 2 Grade Manitoban wheats exhibited an appreciable spread between the data of the Atlantic and the Vancouver varieties. The former were stronger and more stable and also possessed a higher protein content. Hence, the Atlantic wheats had the better carrying power for weaker wheats. Average data for the arrivals of Manitoban wheat examined during the year under review are given in Table 1.*

The Northern Spring wheat imported from America was nicely strong but not up to the Manitoban standard of strength. It was not, however, much below the No. 1 or No. 2 Vancouver Manitoban wheats in strength, although significantly lower in protein content. Average data for the 1951 arrivals of this wheat were: protein 11·90 per cent., maltose figure 1·97, stability 81, strength 57.

In addition to the Manitoban wheat Durum wheat was also imported from Canada. Durum wheat belongs to a botanical species different from that which embraces the bread wheats and is employed in the production of semolina for the manufacture of macaroni. This wheat is nevertheless used in the bread grist, although it is a wheat which should not be used too freely. The reason for this is that its protein is very stable for the strength and lacking in liveliness; hence the flour from a grist containing a high proportion of Durum wheat will give a dead and clay-like dough. Another characteristic of Durum wheat is its high maltose figure. Average data for the year's arrivals are: protein 12·18 per cent., maltose figure 2·57, stability 103, strength 45.



Said to be the oldest in Europe, this windmill erected between Soignies and Ath, Belgium, is believed to have been built towards the end of the twelfth century.

Useful Filler Wheats

A useful filler wheat is Plate wheat from the Argentine. Often this gives an average strength figure of about 45 but the 1951 arrivals were rather stronger. Usually the protein properties of these wheats were satisfactorily balanced and they were useful wheats. The average data for the arrivals in 1951 were: protein 11·82 per cent., maltose figure 1·89, stability 88, strength 54.

Another useful filler wheat and one which has given data very much like those furnished by Plate wheat in many seasons is American Hard Winter. Often this wheat and the Plate variety could be regarded as interchangeable as far as baking quality and blending potentialities are concerned. Average data for the year under review were: protein 11·81 per cent., maltose figure 1·67, stability 65, strength 45.

Wheats below Filler Standard

A Canadian wheat which is below the filler standard in strength but nevertheless is stronger than the weak wheats like English is Alberta Red Winter. This wheat often has a fairly distensible type of gluten and hence could often be used to advantage for blending with wheats which possess a stiff and harsh type of protein. A few samples of Roumanian wheat imported in 1951 gave data which were not very different from those of the Alberta Red Winter samples but the proteins were rather more stable and

TABLE 2

AVERAGE DATA FOR SOME WEAK WHEATS IMPORTED DURING 1951

	Protein Content per cent.	*Maltose Figure*	*Stability*	*Strength*
Alberta Red Winter ..	10·09	1·35	45	31
Roumanian	10·40	1·55	57	34
Australian	9·89	1·72	52	24
Soft White Pacific	8·61	1·52	35	18
French	9·04	1·42	41	22

* The wheat data quoted in this article are based upon determinations made in the author's laboratory, in which samples from every boat load of wheat imported into Britain are examined.

In striking contrast to the windmill is this recently constructed 38-sack mill which has been erected at Lisbon. *Photos Henry Simon, Ltd.*

not quite so distensible as those of the latter. Average data for the two types are given in Table 2.

The imported wheats which rank as weak wheats were Australian, Soft White Pacific, and French. It is not customary for French wheat to be imported, although 1951 was not the first year to see its importation, but Soft White Pacific and particularly Australian are regular arrivals. Average data of the arrivals of these three wheats for 1951 are given in Table 2, from which it will be seen that there is little to choose between them in strength, and that all of them have a low protein content.

A large proportion of home-grown wheat is low in protein content and very weak. On the other hand, some stronger varieties are grown and although these are not strong wheats and in many instances not even filler wheats, they are nevertheless significantly superior in baking quality to the ordinary weak varieties.

The manufacturer of biscuits, however, requires a flour that is almost the opposite of a bread flour; it must be low in protein, weak, and fairly distensible. Many of the weaker types of native wheat yield flour with these characteristics and hence are suited to the production of a biscuit flour.

The harvest was generally a satisfactory one from the point of view of absence of sprout and hence the maltose figures were in general satisfactory. The average data for the year were: protein 9·20 per cent., maltose figure 1·71, stability 40, strength 22. A glance at Table 2 will reveal that these average data are extremely close to those for the French arrivals, a similarity which is perhaps not surprising.

Wheat Grists

The wheat grists to be employed by the industry continued to be prescribed by the Ministry of Food and the official blend was amended periodically according to the wheat situation. The native wheat content was quoted as a minimum, because the use of native wheat is encouraged. The minimum percentage of native wheat required in the blend varied from 15 per cent., when the crop year was drawing to its close, to 30 per cent., when new crop wheat was freely available.

The Manitoban portion of the blend was quoted as a maximum and it varied from 55 to 30 per cent. Later in the year, the Ministry of Food no longer quoted an overall figure for Manitoban but quoted maxima for different grades of this type of wheat. Thus, Grades 1 and/or 2 were at one period restricted to 15 per cent. of the blend and the same maximum was set for No. 3 and/or 4 Manitoban and for No. 5 Manitoban. Subsequent to that instruction, the maximum proportion of No. 5 Manitoban was reduced to 10 per cent., while the maximum for No. 3 and/or 4 Grade wheat was raised to 35 per cent.

Australian wheat was a permitted constituent of the bread grist but the quantity allowed in the blend was restricted for most of the year to 10 per cent. In blended grists intended for purposes other than breadmaking, however, Australian could be used unrestrictedly.

Flour Quality

The official insistence later in the year upon grists which contained a good proportion of new crop native wheat and at the same time a preponderance of low grade wheat, including No. 5 Grade, in the Manitoban portion of the blend led not unnaturally to a falling off in flour quality. Millers cannot be expected to produce a good flour at an extraction as high as 81 per cent. if they are forced to employ a grist which contains a high proportion of lower grade Manitoban. Not only is the amount of flour yielded by the lower grade Manitobans, and particularly by the thin No. 5 Grade wheats, appreciably less than that obtained from the higher grade Manitobans but the quality of that flour is significantly inferior to that from the latter wheats.

The inferiority lies in two directions: baking quality and colour. Hence, when a grist contains a high proportion of lower grade Manitoban wheat it is to be expected that the flour produced from it will be somewhat dull in colour and will yield a dough which is inclined to exhibit some

lack of springiness, and indeed possibly to feel rather "dead."

Such tendency to sluggishness in a dough has a restrictive influence on oven development and tends to detract still further from the crumb colour, which is already inferior because of the rather dull colour of the flour. Today, when we are still faced with a restricted diet, it is particularly desirable that none of our foods, and certainly not a staple food, should be unnecessarily degraded in quality. If thin wheats have to be used in the grist, then the rate of extraction should be reduced accordingly, so that flour quality can be maintained.

The addition of *creta praeparata* to bread flour is still obligatory and the quantity to be added remains at the level of 14 oz. per sack of 280 lb., the proportion adopted when the extraction was 85 per cent.

Flour Treatment

Following the discovery that nitrogen trichloride, the substance which is widely used as a flour improver under the name "Agene," is able to cause hysteria in dogs, the addition of this substance to flour was voluntarily discontinued in America, although human feeding trials had failed to produce any evidence that the compound had any ill effects upon man.

A Committee set up by the Ministry of Food, under the chairmanship of Sir Wilson Jameson, to report upon flour treatment advised that the use of nitrogen trichloride should be discontinued also in Britain, and that the compound now used in American mills, namely, chlorine dioxide, should be adopted in its place.

The authorities would, however, now seem to have reached a stage of indecision and to be less inclined to give to chlorine dioxide the whole-hearted support which they evinced earlier. It is difficult to see what can be the reason for this change of attitude, since numerous animal and human feeding trials with chlorine dioxide have failed to produce any evidence that this compound has any harmful effects.

There is no doubt, as admitted by the Sir Wilson Jameson Committee, that some form of artificial ageing is necessary if the baking potentialities of home-milled flour are to be developed to the full. It would be regrettable if millers, if they so desired, were prevented from choosing a gaseous form of treatment, which enables flour divides to be treated according to their needs, provided that extensive feeding tests, preferably including some on humans, had shown the gaseous treatment in question to be without ill effects.

The reawakened interest in the subject of flour treatment gave new life to those who have for long been opposed to the use of any chemicals in flour. A number of these people reviewed and discussed the problem with a realistic outlook but unfortunately, as was the case in the white *versus* brown bread controversy, others entered the list who were willing to put forward the most ill-founded arguments in support of their viewpoint and who treated the matter in a completely unrealistic manner.

Appearance is Important

A factor which is often overlooked, or perhaps purposely ignored, by these people is that the improvement in appearance, in eating properties, and in keeping qualities which ageing, artificial or natural, confers upon the bread made from a flour has a very real bearing upon the dietary value of the bread.

The nutritional importance of any food is governed by its nutrient content and by the amount of it which is consumed, and this latter factor is in turn governed by the eye and palate appeal of the food. If all chemical treatment of flours were prohibited, the standard of bread quality would fall sufficiently to lead to a marked drop in bread consumption. This could have a decidedly adverse effect upon the nutrition of those who fall within the lowest income group, since bread supplies over 30 per cent. of our protein requirements and contributes significantly to the intake of aneurin and nicotinic acid.

It is expected that a statement on the subject of flour treatment will be made in official circles in the near future; it is to be hoped that the foolish step of prohibiting all flour treatment will not be taken and that *gaseous* treatments other than nitrogen trichloride, and particularly the recommended chlorine dioxide, will be in the permitted list.

Physical Flour Improvement

A method of effecting promptly an artificial ageing of flour without recourse to chemicals, has been patented recently. The principle of the method is to make a batter with some of the flour and all the water and to mix this at a very high speed, in the region of 350 r.p.m., whereby oxygen is whipped into the mixture. The remainder of the flour is then added and the fermentation proceeded with in a normal manner. By the aid of oxidase systems, either natural to the flour or added in the form of, say, soya flour, the oxygen incorporated in the batter is made to react in such a manner that the improving and bleaching effects of chemical improvers are reproduced.

The suggestion has been made that were chemical additions to flour to be banned their place could be taken by this "batter process." Such a scheme, however, presents considerable practical and economic difficulties. For example, there are in the region of 24,000 bakers in Britain and even the smallest bakery would need two of these special mixers, so that a spare was available should the other machine break down. If no spare were available, the baker would be obliged during the period of repairs to mix by hand or by an old slow-speed mixer and he would, therefore, be in effect producing bread from untreated flour. He would certainly not sell this in competition with the treated bread of other bakers. Very many small bakers, however, could not face the cost of two of these machines.

In the author's opinion the answer to a complete stoppage of chemical ageing of flour would not be high speed oxidation of a batter

in the bakery but continuous heat treatment of the flour in the mill. It is to be hoped, however, that a need to find an alternative to the long established chemical ageing will not become necessary; the prohibition of the use in flour of the very small amounts of the recognised improvers other than Agene, which have passed satisfactorily all animal and human feeding trials, would be a retrograde step that would serve no useful purpose.

Ergotism

During the year under review the press made great play about a mysterious illness which attacked those inhabitants of a French village who consumed bread from a certain bakery. The malady was characterised by hallucinations about fire and serpents, and in several instances it terminated fatally. The toxic nature of what the press called "the madness bread" was traced to the presence of ergot in the wheat from which the flour had been produced. These rather alarming incidents raised the question in the minds of some people whether such an occurrence could happen in Britain.

Ergot is a fungus which can attack grasses and cereals during the flowering stage but it is rare to find a cereal other than rye heavily infected with it. By the time an infected cereal is harvested the mycelium of the fungus has hardened into compact masses which are known as "ergots."

Ergots are occasionally found in very small amounts in imported wheats but their shape and size are so different from those of the wheat grain that they are automatically and readily removed by the normal cleaning operations to which all wheat is subjected before it goes on the mill. It can safely be said that there is no danger of ergotism occurring in Britain from the consumption of goods made from wheat flour.

Considerable interest has been shown in America in the possibility of employing fungal enzymes for the diastatic correction of flour and much work has been done on the separation and concentration of diastatic enzymes from moulds. The mould usually employed is *Aspergillus oryzae*, which today is grown in deep culture, whereas in the early days of this work it was grown on shallow layers of bran.

A. oryzae produces many enzymes but American workers have developed methods which enable the amylases to be separated from the other enzymes. Moreover, it is now possible to prepare enzyme concentrates which exhibit a marked activity in one particular direction. For example, concentrates are available which have a high alpha-amylase activity, or a high dextrinase activity, or a high maltase activity. Concentrates have also been produced which are markedly proteolytic in action but which have little effect upon starch.

These diastatic fungal enzyme concentrates are very potent, many of them being 50 times as active as a good malt flour. It is necessary, therefore, to dilute these products, so that the quantity to be added to flour is capable of more accurate control. The use of a diluent also permits the mixture to be brought to any desired degree of enzymic activity.

The use in the milling and baking industries of standardised fungal enzyme products with specific enzymic activities offers considerable scope and it is to be expected that such materials will eventually make their appearance in Britain. It may well be that in time they will replace malt flour in those instances where it would be used because of its diastatic or proteolytic action.

Cake Flours

Before the war, British millers were becoming interested in the American "Hi-ratio" cake flours, and some mills were marketing a flour of this type. These speciality flours were developed in America for the purpose of making a certain very light type of cake of which Angel cake was a good example. These cakes contained very high proportions of sugar and fat — hence the name Hi-ratio — and a flour with special properties was needed to carry these. A good Hi-ratio cake flour was a finely dressed, short patent flour milled from a very weak and starchy wheat which had been treated with a heavy dosage of chlorine. It was important that chlorine should be used to effect the treatment—nitrogen trichloride was not satisfactory. The fine granularity was a characteristic of the best of these flours; some samples from America were dressed through a 20 silk.

The production of cake flours along these lines has recommenced since the war but they are not true Hi-ratio cake flours. They can be made from weak wheat and can be treated at a high level with chlorine but since the basic flour is of necessity an 81 per cent. extraction flour, they will naturally behave differently from a genuine short patent Hi-ratio flour. The description Hi-ratio for these cake flours made from the current long extraction flour is a misnomer and they would not in fact prove satisfactory in the production of cakes of the Angel variety. On the other hand, these speciality flours are good all-purpose cake flours and as such are likely to give better satisfaction than cake flours which are merely made from a weak grist without any special treatment.

A matter of some moment relating to these speciality cake flours is the chemical treatment. The purpose of the chlorine treatment is twofold; it should destroy the normal gluten properties and render the dough very short in nature and, equally as important, it should also appreciably reduce the *p*H of the sample. Chlorine is the only one of the commercially used improvers which will do this; the other improvers will make the gluten short if they are used in sufficient quantity but they will not have the same and necessary effect upon the *p*H and this is the reason why chlorine is essential if a good cake flour is to be made.

If all *gaseous* improvers were banned, a suggestion which was mooted not very long ago, then these speciality pseudo-Hi-ratio cake flours would have to disappear from the market. The authorities could not ban the use of chlorine as a bread flour improver and at the same time permit it to be used at a very much higher level in cake flour, even if cakes are eaten to a considerably lesser extent than bread.

Rancidity in Stored Fish

THERE has been considerable controversy regarding the ability of ascorbic acid to retard development of oxidative rancidity in cold-stored fish, for results reported have varied from a marked improvement in keeping quality to no noticeable effect. In one instance it has been stated that treated herring developed a slightly unusual flavour. However, the fact that this treatment is being applied on quite a large scale commercially would indicate that its use may have some merit.

An experiment was undertaken by H. L. A. Tarr, B. A. Southcott, and H. M. Bissett at the Pacific Fisheries Experimental Station with the view to determining whether the *post-mortem* age of fish at the time of freezing influences the onset of oxidative rancidity in the frozen product, and how this age affects the antioxidant efficiency of ascorbic acid. Under commercial conditions ascorbic acid is frequently applied in 0·3 per cent. concentration in a solution made slightly viscous with 0·5 per cent. of the seaweed extract carrageen (or a commercial methylated cellulose thickener), and not as a straight 1 per cent. solution as originally used at the Station. The experiment was therefore also designed to test the relative effectiveness of the two methods.

Three prime quality red spring salmon weighing about 18 pounds each were dressed and iced and received at the laboratory about 12 hours after capture. One fish was prepared immediately for each of three cold storage temperatures studied, and, after washing well, six steaks about ¾ inch thick were cut from the head end; these were cut longitudinally so that twelve individual portions resulted. Two different treatments were applied, using four pieces in each. (1) Dipped 1 minute in a solution containing 1 per cent. ascorbic acid maintained at about 57° F. and (2) dipped similarly in a solution containing 0·3 per cent. ascorbic acid plus 0·5 per cent. high-viscosity carrageen. The remaining four pieces were used as controls, undipped.

The treated portions were promptly, individually, and tightly wrapped in plastic-film-laminated aluminium foil, and four from each treatment were frozen in moving air at 14° F. After about 18 hours the wrapped steaks were placed together in polyethylene bags, and these were stored at this temperature in large cans with tightly fitting lids.

After removing the above steaks and sealing the cut end with polyethylene paper, the remainder of the fish was stored in crushed ice at 35° F. The whole above process was repeated after 4 and 6 days storage in ice, the first steak at the cut end of the fish being discarded before cutting the six experimental steaks.

The two remaining fish were treated similarly, the steaks being frozen and stored at −4° F. and about −18° F. respectively. In this manner four portions of fish representing each of the three treatments were made available for analysis at different times during storage at the three temperatures.

Since it was impractical to conduct tasting tests with the small amount of material available, peroxide values were used as a comparative index of the rate of development of oxidative rancidity, as in previous work. From consideration of the results of two series of determinations on the stored samples it was apparent that so far no important difference is noticeable in the rate of development of oxidative rancidity in fillets cut from fish stored for different periods in ice as compared with the untreated samples, and that with the ascorbic acid-treated portions oxidation seemed to proceed somewhat more rapidly in the fish stored in ice for the shorter times. It is hoped that analyses of the fish after longer storage periods will permit more definite conclusions to be drawn.

Treatment with the mixture of ascorbic acid and carrageen was apparently just as effective as that using ascorbic acid alone in much higher concentration. This result is important since, as has already been stressed by practical processors, it permits a somewhat less expensive treatment. The value of low storage temperatures in retarding oxidative rancidity, emphasised in former work, is again borne out in these experiments.

Bread Research in Australia

A REVIEW of the work of the Research Advisory Committee of the Bread Research Institute of Australia is included in the recently published report of the Council for the year ended December 31, 1950.

Two important projects have been studied: the utilisation of skim milk powder in bread and a nutritional survey of Australian bread. Work under the first project has been undertaken in conjunction with C.S.I.R.O., and Mr. J. W. Lee, Research Officer of that section, has been stationed at the Institute in connexion with these investigations.

The considerable wastage of skim milk in Australia is a matter of serious concern, both economically and nutritionally, and it is hoped from the investigations being carried out that an effective and economical means of incorporating skim milk powder in the basic Australian dough will be found possible, giving an improvement not only in the nutritional value of the loaf, but also in its physical characteristics.

The Australian Institute of Anatomy is joining the Institute in its survey of Australian bread for thiamin, riboflavin, and nicotinic acid content. When available, the results should prove of considerable assistance to the baking industry in deciding a policy of improvement in the nutritional value of Australian bread.

On behalf of the Commonwealth Food Research, work has been commenced at the Institute for the production of high quality canned and foil-wrapped bread for the armed forces. This work involves not only the technological aspect of canning, but also work on the retardation of bread staling and on prevention and control of mould growth and rope development.

Raising the Status of the Iced Lollie

Some producers of iced lollies, or "frozen confections," as they prefer to call them, have sought to raise the standard of manufacture by the use of high grade ingredients and modern, hygienic methods of production. This article describes how one producer has implemented his conviction that future success lies with a quality product and that the trade can be built up to reach the same high position in public appreciation as has been achieved in America by the "popsicle."

THREE years ago the iced lollie was barely known, but during the past year a large number of ice cream manufacturers, faced by growing difficulties in the making and selling of their commodity, turned their attention to the production of a cheap but nutritionally imperfect type of lollie.

Health authorities were not slow to criticise the product and demands for Government action to impose standards and hygienic control have had the support of trade associations. Present legislation, which is stringent in regard to ice cream, leaves the manufacture of iced lollies in a vague, confused position.

Twenty-five years ago Mr. T. T. Campbell Garratt, who, with his father, founded the Ryvita crispbread business, which was sold eighteen months ago to the Canadian millionaire, Mr. Garfield Weston, turned his attention to iced lollies, having noted the attraction they had for his young children, who often actually preferred them to ice cream.

The Doulton storage vats at the Hampton Wick factory.

As a result of his visits to America Mr. Garratt was impressed by the popularity of the popsicle there, and realised that it differed in some way from the lollies that seemed to be becoming popular here. His interest aroused, he began making enquiries, both in Britain and, through friends, in America. The results he found intriguing.

The 50-gallon pasteuriser and cooler of the pilot plant.

The American Product

Across the Atlantic the stick confection was a well-flavoured product, possessing a certain "body" and in substance was almost a candy. Here, the lollie was usually ice hard; it could only be sucked, not bitten, and often the flavour and colour were only skin deep. The poorest types, forming the majority of those offered to children, consisted of water, with colour and flavour, both synthetic. They were sweetened with saccharin, and frozen hard. Others were based on diluted fruit juice and contained a

The lollie moulds are sterilised four times a day.

small proportion of sugar and a stabiliser to ensure dispersion of the flavour and colour throughout the product. Mr. Garratt was able to find only one type approaching the candy nature of the American popsicle.

Plans for British Production

This example was sufficient to show that the secrets of making a quality product were not wholly unknown to British manufacturers. Mr. Garratt then sought the advice of food chemists on the subject. Having satisfied himself that a refreshing, health-giving frozen confection could be mass-produced he decided to set up a pilot plant to carry his investigations further. His interest in food manufacture and marketing had again been aroused.

By last May everything was ready for production on a commercial scale. Premises at Hampton Wick, Kingston-on-Thames, Surrey, were converted into a model factory on strict lines of hygiene; processing and refrigeration plant and equipment were installed; and the company, Frozen Confections Ltd., was formed to manufacture and market the new iced fruit lollie.

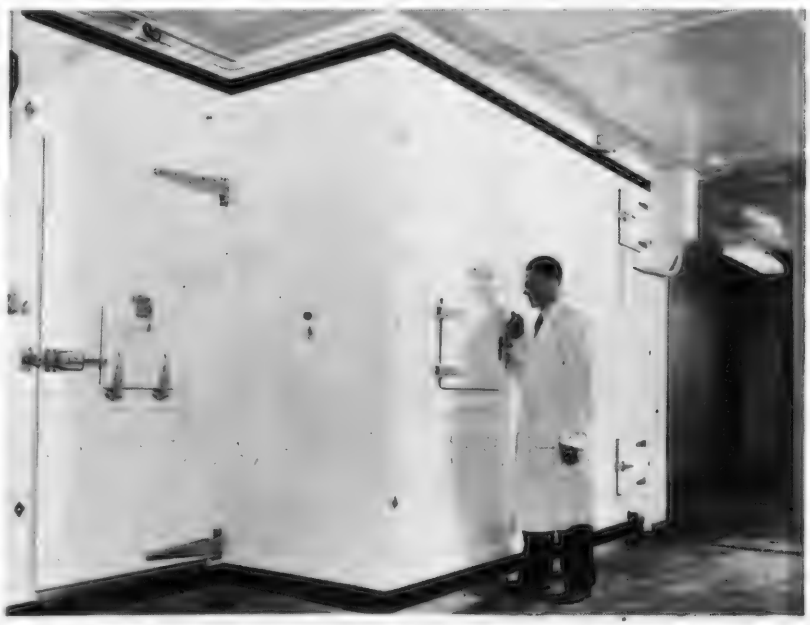
Partly as a compliment to America for the knowledge he had gained of the popsicle product, and partly from that flair for publicity which had marked his success with Ryvita, Mr. Garratt chose the brand name "Topsy". for these "lollies with a difference." The lovable character from "Uncle Tom's Cabin," the little black girl with her plaited pigtails and big bows, and her little cotton frock, was admirably suited to appeal to children.

In order to attract the attention of adults, and to allay any feeling of suspicion as to their nutritive value, the slogan, "It contains sugar for energy, fruit for fitness, and it's pasteurised for purity," describes succinctly and forcefully the outstanding features of frozen confections.

Manufacture of Iced Lollies

The actual manufacturing process is relatively simple. It is mainly on the use of high grade raw materials that quality depends. The only ingredients are fruit, diluted fruit juices, sugar, and a stabiliser to hold them together. This last-named product, also used in ice cream, ensures that the fruit and fruit juice are "set" right through the lollie, so that sucking does not remove them quickly, leaving a mere block of ice.

The ingredients provide the frozen confection with a high total solids content, compared with the virtual absence of solids from the frozen water type of product. This



After bagging, the lollies are packed in cartons and placed in one of the cold stores.

nutritional benefit, incidentally, is responsible for one disadvantage from the point of view of the selling angle. The attractive appeal of animal shaped lollies cannot be used, the small protrusions of ears, hands, etc., breaking away too easily because of the softer substance of the frozen mix containing a high solids content. Moulds in such forms can be used successfully only with a mix that will freeze as hard as ice.

At the Kingston factory, purity of the product is safeguarded from the raw material stage, the different ingredients being subjected to laboratory tests before the making up of a mix. Even so, this is then subjected to heat treatment and rapid cooling to 45° F., following ice cream manufacturing practice. This pasteurisation process is by no means common in the production of iced lollies and it remains a debateable point as to whether or not it is legally required. In order that no precaution should be omitted to ensure purity, the ingredients used are almost exactly those given in old-time recipes for the making of water ices, these being covered by the Ice Cream (Heat Treatment, etc.) Regulations, 1947.

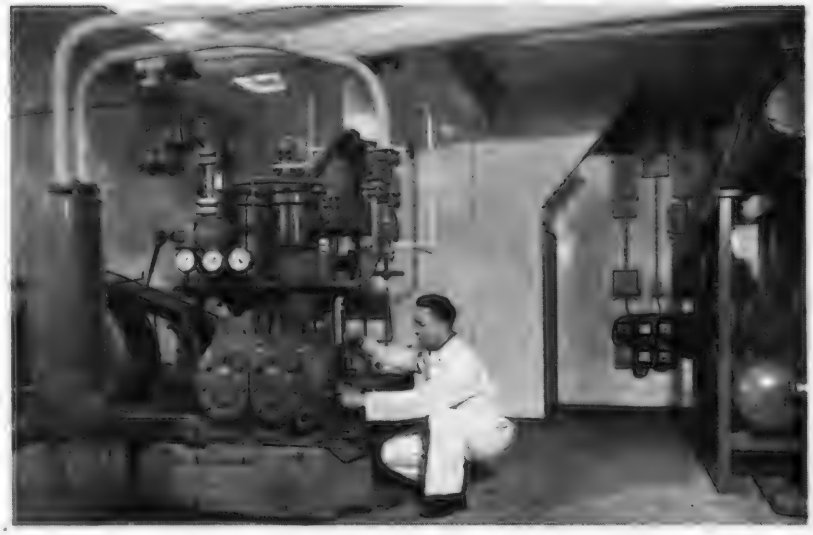
Freezing Process

From the cooler, the "Topsy" iced fruit lollie mix passes into refrigerated stainless steel ageing vats and thence is piped to large storage vats. From these, supplies are drawn as required by the mould filling department. The freezing process takes place as the filled moulds float through a tank containing brine maintained at a temperature of −15° F. Rapid freezing of the lollies, one of the secrets of successful procedure, is achieved, the time required being nine minutes.

At the end of the brine tank is a thawing tank, a quick dip of the moulds in this sufficing to loosen the frozen confections and, to use the technical term, they are "harvested" for immediate automatic, individual bagging. Packing into cartons follows quickly and these then pass into one of the cold stores.

There they are kept at a temperature of −5° to −10° F. for a period of at least 24 hours. It has been found that this hardening process brings about an improvement of the product and produces a slower melting rate.

"Topsy" iced fruit lollies are then ready for despatch. The company use refrigerated road transport only—a fleet of 10 cwt. vans, each carrying 10,000 lollies, 5 ton lorries with capacities for 50,000 to 60,000 lollies, and British Road Service vehicles holding 100,000 lollies.



A section of the factory, showing the compressors.

A Quality Product

The dominating factors in Mr. Garratt's new enterprise in food manufacture to raise the status of the iced lollie are quality and purity of product. Quality comes from a persistent seeking after the "know-how" of frozen confection manufacture and the use of high grade materials; purity from an insistence on perfect cleanliness in the factory itself, on choice of processing methods, equipment which is thoroughly cleaned and sterilised immediately following every production run, and on careful instruction and supervision of staff. Nothing is left undone that would aid the cause of hygiene.

All this has won its reward. Already the business has achieved astonishing success, trade support through the popularity of "Topsy" making necessary present arrangements for production to be quadrupled before the coming summer season. That is a reason for satisfaction, but perhaps Mr. Garratt cherishes most the award of the certificate for quality and merit granted by the Royal Institute of Public Health and Hygiene after the usual investigation. His is the first firm of iced lollie manufacturers to receive this certificate.

LIST OF SUPPLIERS

Compressors: *J. and E. Hall; G. and J. Weir.*
Water cooling tower: *Visco Engineering Co.*
Brine bath: *S.B. Engineering Co.*
Brine bath pumps: *Girdlestone Pumps.*
Mix cooler: *T. Guisti and Sons.*
Pasteuriser: *Nathan's Sales.*
Cold room: *J.D. Insulating Co.*
Refrigerated vans: *Fords, insulated by Reall (Coachbuilders).*

New Books Register

Orders for any of the books listed below, or scientific and technical books in any language, may be placed with the Books Department, FOOD MANUFACTURE, *17, Stratford Place, London, W.1. A selected stock of books is carried and may be inspected at the above address. Prices given do not include postage.*

Lilly, V. G., and H. L. Barnett. *Physiology of the Fungi.* McGraw-Hill Publishing Co., London and New York. Pp. 464. Illustrated. 64s.

National Vegetable Research Station. First Annual Report. Pp. 60. Illustrated. 6s.

The Manufacture of Maize Starch

J. A. Radley, M.Sc. F.R.I.C.

PART III

SEVERAL types of filters are used for dewatering and washing the starch. The American filter, and to a lesser extent the Oliver filter, and other types of drum filter, such as the Feinc filter, are used for dewatering and washing the starch, while the Sweetland filter press is used in a few mills. Centrifuges can and are also used for washing and dewatering the starch.

The slurry filters more easily if its temperature is adjusted to about 130° F., and the wash water used may be at 135° to 140° F. The optimum *p*H for filtration is about 4·0, the dewatering being slower when the *p*H is in a higher range. The correct range is normally maintained by the addition of a small amount of sulphur dioxide at the first washing filter, and this addition also serves to inhibit bacterial action during drying. It is largely driven off when the starch is heated in the driers, although the author has found from 7 to 50 p.p.m. of sodium dioxide in recent samples. Filters reduce the water content of starch to about 45 per cent.; high speed centrifuges reduce the moisture content to 33 to 35 per cent.

The liquor from the tables containing the gluten is settled in tanks, and the overflow water from these is used for steeping. Other suitable concentrating devices are also used.

Other systems used industrially for the separation of starch from gluten involve the use of centrifuges[40-47] either alone or in combination with tabling.[12]

In Peltzer's method[43] starch liquor of 12° Bé. is delivered continuously to the rotor, and a substantial amount of the underflow of starch from the machine is mixed with fresh liquor and continuously returned to the machine in order to assist in carrying out the centrifugally separated starch particles. Several machines may be used in series when the underflow of starch from the first machine may be further refined in a second centrifuge, while overflow of gluten is treated for further starch recovery in a third centrifuge. This last product consists chiefly of the small starch granules, and contains from about 1 to 10 per cent. protein. It is similar in composition to the squeegee starch mentioned above.

The continuous DeLaval centrifuge and the intermittently fed, basket type, such as the Broadbent machine, have also been used especially in this country.

The Grinco filter in operation.

Centrifuging the Grist

Peltzer[16] has proposed centrifuging the grist from the buhr mills without preliminary removal of fibre and fine grits. Much of the fibre is carried off in the overflow, which contains, primarily, the gluten fraction; the centrifuged starch is then freed from fine grits by sieving through silk. It is claimed that the content of water soluble material in the process liquors in the mill houses is greatly reduced by this method. The liquor from the mills is filtered and the filtrate passes directly to the steeps. The water used for washing the cake is reused in the milling operations while the filter cake is reslurried to a liquor of suitable density for centrifuging, using some overflow water from the first centrifuge and some liquor from the final dewatering filters. Other portions of liquor from dewatering filters are used to wash the starch fraction in the centrifuge and to wash the grits on the silk sieves which follow the centrifuges. A gluten slurry thick enough to be passed directly to filter presses is obtained.

In many mills the settled liquor coming from the tables is treated in continuous centrifuges to recover additional starch and to obtain gluten containing a relatively high protein content. By these methods gluten containing 60 to 70 per cent. protein and starch

A centrifugal type of drier.

Buttner drier on the left, flash drier on the right.

containing as low as 0·2 per cent. protein are commonly obtained in practice.

Several patents cover the use of flotation agents for separating starch and gluten, but although one mill actually employed this principle in commercial practice it was discontinued in favour of tabling.

Starch is often converted to glucose and other products in the mill which produces it from the grain, and in such mills the water used is either softened water or the condensate from various evaporators and boilers. The presence of lime in the water can lead to the product being contaminated with calcium sulphate, since some of the sulphur dioxide, which is commonly added at various places in the system, undergoes some oxidation. The steepwater from starch manufacture is evaporated to recover the soluble protein, phosphate, phytate, inositol, and growth adjuncts. These solids can be mixed with gluten, the germ cake from the oil expellers, and the grits, in dietetically correct proportions and the product is sold as feed for cattle. Sometimes the dried materials are mixed with steepwater and then dried.

Drying the Starch

After washing and dewatering, the starch may be dried and disposed of as raw unmodified starch, or it may be processed in various ways to modify it or converted to syrups or sugars by hydrolysis. Formerly, kilns[48] were used almost exclusively for the drying operation. In this, the starch cake is broken up and placed in wagons, such as the Bauer wagon,[49] or on trays, which are then loaded on to a carrier, as with the Mitchell drier, and these are moved through a heated tunnel or kiln over a period of from ten to twenty hours. In the Bauer wagon, the sections stand in a vertical position in contrast to trays which are placed on carriers in a horizontal position.

Rotary driers are used, particularly for the rapid and continuous drying of modified starches. In the U.S.A. the Huhn drier, and in Britain the Mitchell vacuum drier, are used for reducing the moisture content from normal levels of 10 to 12 per cent., such as is obtained in kiln drying, to 5 to 7 per cent. The latter operation is employed, for example, prior to dextrinisation of starch.

In Britain a general practice is to reduce the moisture content to the 1 to 2 per cent. region prior to dextrinisation, a figure readily reached with the Mitchell vacuum driers.

In investigating this step in the author's laboratory it was found that in kiln drying starch after acidification and prior to dextrinisation practically all the acid was retained, but in vacuum drying about two-thirds of the acid appears in the water trap to the vacuum pump.

Modern practice also makes use of continuous belt driers.

In the final filtration, the starch is accumulated on a revolving drum of the Oliver type, so as to form a sheet 0·25 to 0·50 in. thick. The sheet is scored so as to break into ribbons about 1 in. wide,[50] and these in turn are broken into lengths of about 2 in. The pieces are relatively uniform in size and are deposited on to an endless belt made of bronze wire, which carries them through a tunnel or series of heated chambers over a period of from 30 to 45 minutes. Heated air is blown through the bed of starch, which is about 1·5 to 2·5 in. in depth. The temperature employed, the speed of the belt, and the depth of starch on the belt are mutually interdepen-

dent variables. These are adjusted so as to obtain the final desired moisture content for the volume of starch which it is desired to pass through the drier per unit time. The air temperature in these driers varies from about 120° up to about 285° F.

In the last section, a forced draft of cold air is applied in order to cool the starch. A reduction in drying time to less than one hour very nearly obviates the necessity for adding sulphur dioxide to the starch wash water in order to protect it from bacteriological contamination during a long drying period.

The Burk Ring drier is another device which is of value for drying starch. A reduction in the acidity of the starch and a reduction in the time the acidified starch is exposed to higher temperatures reduce the loss in paste viscosity normally experienced in kiln drying. Local overheating of the starch is much less when the endless belt type of drier is used than when kilns or rotary driers are used, and the moisture content throughout the mass is more uniform.

Very frequently starch is found in some sections of the wagons leaving the kilns having as low as 2 per cent. moisture content, while in other sections the starch will contain 18 to 20 per cent. moisture.

Starch from the driers is crushed to a pearl form or it is milled, as, for example, by the use of the Kek mill, then bolted through silk sieves in order to obtain a powdered form.

Manufacture of Lump Varieties

The lump varieties of starch, the so-called crystal forms, are made by two general methods. A box type of filter lined with canvas is filled with a slurry of starch, either by gravity or suction, and then the water removed. The cubes are wrapped in paper and placed in crusting kilns and the starch partially dried. The moisture, in its passage from the interior of the block, brings with it any soluble non-starchy matter which may be present, and this dries out on the surface of the block. After a substantial reduction in moisture content has been achieved, the crust is removed and discarded; the core of the cube is dried to normal moisture levels and then broken into the desired particle size.

Under correct drying conditions the solid block of starch will, at a certain moisture content, commence splitting into pieces or crystals, which can be further reduced in size by mechanical means.

At one time the addition of a small amount of dextrin to the liquor before forming the block was practised to give a mechanically strong crystal. Moffatt[51] forms a cake of moist starch by pressing it into a heated cylinder with a plunger. The cake is allowed to age and is then dried to a normal moisture level, after which it is broken into the desired particle size.

REFERENCES

[40] De Castro, J., and Muller, T. H. U.S. Patent 273,128; 1883.
[41] Kerr, G. A. U.S. Patent 471,614; 1892.
[42] Schrader, R. U.S. Patent 757,778; 1904.
[43] Peltzer, A., and Peltzer, A., Jr. U.S. Patents 1,923,454; 1,923,455; 1,933,119; 1933 and 1,945,786; 2,013,668; 1935.
[44] Peltzer, A. U.S. Patent 2,097,531; 1937.
[45] Boie, H. U.S. Patent 2,124,284; 1938.
[46] Peltzer, A. U.S. Patent 2,316,807; 1943.
[47] Kelling, A. H. U.S. Patents 2,100,744; 1937 and 2,103,217; 2,114,497; 2,115,170; 2,115,171; 2,124,779; 2,133,543; 1938.
[48] Merrill, J. J. U.S. Patent 1,183,097; 1916.
[49] Bauer, L. P. U.S. Patent 1,035,302; 1912 and 1,061,720; 1913.
[50] Tiers, L. P. U.S. Patent 2,327,943; 1943.
[51] Moffatt, A. U. U.S. Patents 541,125; 1895 and 541,941; 1895.

Photographs Audible Slide Films by permission of Brown and Polson.

Fat Processing

THE early processes for obtaining oils and fats from their source materials and for refining them were all of the discontinuous or batch type, and it is doubtful if any continuous method was put into use before the early years of this century. The great expansion that took place in the industry between 1920 and 1939 prompted technologists to develop continuous working, and considerable headway had been made by the time war broke out.

Even greater progress has been made in the years immediately succeeding the cessation of hostilities, and it is probably true to say that every type of treatment that needs to be applied to fatty oils can now be made continuous. Batch processes retain their popularity in some cases, because they are either cheaper to install or more convenient to operate, and because there is a disinclination to scrap a process that has worked well for many years; but the newer, continuous means of treatment are slowly ousting the older methods as their advantages become more widely understood.

* *Continuous Processing of Fats.* By M. K. Schwitzer, A.M.I.Chem.E. Pp. xix+354, with 70 plates and figures. Leonard Hill Ltd., London. Price 30s.

In his book* Mr. M. K. Schwitzer gives a very good account of the extent to which the turnover from batch to continuous processes has become possible. He begins with a description of the oldest continuous machine for obtaining oil from oilseeds, the Anderson expeller, and after dealing briefly with the development of screw presses passes on to describe continuous methods of oil extraction by solvents.

A chapter on the production of fish oils follows. The next two chapters are devoted to the continuous refining of oils and processes which involve structural change, such as hydrogenation, where the change is chemical, and solvent segregation, in which physical separation of the constituents of an oil takes place.

The author then deals with various finishing processes and turns finally to the continuous manufacture of soap and glycerine.

The book is more descriptive than critical perhaps, but the author is nevertheless to be congratulated on the manner in which he has collected together so much information in so readable a form.

—K. A. W.

Automatic Control in American Food Plants

Leo Walter and Jack Meyer

Part I

The main difference between America and Great Britain in the various methods of food processing is in the wider use of continuous processing in American plants as compared with batch processing. The reasons for this are that the American market is much bigger, labour is more expensive, and the war years have not delayed plant modernisation overseas to the same extent as in Great Britain, where, however, the production of new machinery for continuous processing of foodstuffs and the development of new instruments for measurement and control are proceeding apace. This survey of developments in automatic control in American food factories will thus be of interest to those concerned with this aspect of food manufacture.

IN America, continuous food processing machinery has developed *pari passu* with automatic control, and any new design is inevitably influenced by the necessity of incorporating the latter with the former.

The American manufacturer of modern food machinery always seems willing to perform intensive investigations, coupled with practical experimentation either on a small scale or on full scale pilot plants, in order to anticipate exacting demands from users of food plants requesting maximum possible controllability.

As is well known, competition within each single branch of food manufacture is very fierce in the U.S.A., and often calls not only for new plant equipment, but also, in some cases, for new operating principles. These are developed primarily in the research laboratory of the food manufacturer, then specified to the manufacturer of food machinery, who in turn consults the research department of the instrument maker, before he starts to design. The most urgent need to produce very large quantities of goods at first class uniform quality and at minimum cost usually produces from this collaboration a continuously working and fully automatically controlled food plant, which is then put into operation, even if the first installation cost is higher than that not including extensive instrumentation.

In general the American instrument makers are well geared to meet the heavy demands of makers and users of food machinery; they are able to anticipate new developments in all branches of the industry because their range of instruments is wide, and readily available for automatic plant control which has become standard.

Use of Electronics

The use of instruments which apply electronic relays in place of mechanical relays is increasing, not only for measurement and control of temperature, but also for control of other process variables, such as rate of flow, liquid level, specific gravity, and for measurement and control of ion concentration of liquid solutions. Amplification of a control impulse, derived from change of pressure or temperature, or from any other process variable, can be speedily and exactly magnified, so that an electric current is produced in the control mechanism of an instrument; this current is then used for control movement of a control valve or damper.

By using exchangeable electronic tube units, electronics have become practicable in place of mechanical relays in control mechanisms, and modern fully calibrated plug-in tube units allow simple replacement. American and British instrument makers have a common aim for the future development of electronic instruments, namely to increase the responsivity of automatic controllers by shortening instrument time lags, and to eliminate friction and inertia inaccuracies of mechanical instrument parts.

Continuous Fat Frying

The machinery used for continuous deep fat frying consists usually of a conveyor chain in an enclosure, heated by means of a gas burner beneath the vessel containing the fat. The fumes are extracted by a stack on top of the enclosure, and the fat level is kept close beneath the upper conveyor chain. Fat frying as a continuous heat flow process requires instant response at the right amount from the gas supply controller, otherwise excess temperatures would lead to spoilage of the product.

The electronic instrument type used has been chosen to react with practically no instrument time lag, and produces three-step control, which has proved in practice to meet all control requirements. Conveyor speed has to be adjusted according to the type of frying. This layout is typical for many similar problems encountered where a conveyor band is used to move goods which require heat treatment in one form or another in continuous food manufacture, with speedily controlled rate of heat input at high-low-nil values.

Lard Rendering

Lard manufacture is highly competitive in U.S.A., and in order to achieve high quality and uniformity of the final product time-temperature and time-temperature cycle control are often applied. For open-kettle rendering, using a steam jacket, steam supply pressure is kept steady by means of a non-indicating pressure controller, actuated from an impulse pipe coming from a tapping of the steam jacket. The maintenance of the correct temperature is of the utmost importance and a recorder controller is applied, having its thermostat bulb placed directly in the lard kettle. A gradually acting steam supply control valve to the jacket shuts off steam input, once the

Fig. 1. Automatic coffee roaster control system. *Photo Richheimer Coffee Co.*

correct rendering temperature has been reached.

Dry rendering produces a more difficult control problem, owing to the slight change of temperature in the steam jacketed cooker during the vacuum cycle when moisture is removed. After this period, however, temperature rises rapidly, and the control method quickly reduces the vacuum in the barometric condenser by automatic water injection. A few moments later the steam supply control valve closes automatically, preventing overheating. A two-pen recorder controller is used for combined pressure and temperature control.

Coffee Roasting

An interesting control problem occurs in coffee roasting in order to obtain the desired flavour of a particular blend. The American consumer is particular about his coffee and the firms concerned are anxious to meet the popular demand.

Temperature and duration of the roasting process are the two main factors to be controlled. In Fig. 1 is illustrated automatic control of a roasting cylinder which is heated by means of a fuel oil burner. After the apparatus has been filled with green beans, the operator starts the process by pushing a button. The control system automatically ignites the burner, supervises roasting temperature by automatically adjusting an exhaust damper, and shuts off the oil burner when the coffee beans have reached the proper colour. A timing device then admits a measured amount of water for quenching the beans, and finally a signal light warns the operator that the roast is finished.

It is claimed by the instrument makers that by obtaining a permanent chart record from the recorder controller mistakes in operation are eliminated, and absolute uniformity of the product is assured.

Measurement of Roasting Temperature

Roasting temperature is measured by means of an iron-constantan thermocouple, which is permanently immersed into the roasting cylinder. Impulses from the detecting thermocouple are transmitted to the electronic potentiometer instrument, which has a quick response coupled with high accuracy. The rapid temperature rise near the critical roasting temperature makes it imperative that instrument time lags are low, otherwise excess temperatures would develop. The control panels are located near the individual roasters and the operator can tell at a glance the stage of processing in any apparatus at any time.

Canning Control

Automatic retort cooking of foodstuffs, with alarm signals indicating the end of the cook, increases efficiency of retorting and safeguards uniformity, flavour, and appearance of the canned product.

Generally speaking, the methods and instruments used in the U.S.A. for retort control are similar to those applied in Great Britain.

Automatic retorting seems very popular in medium sized plants, and automatic control of exhausters, coolers, washing apparatus, and other canning equipment has found wide application in modern American canneries. The mass production methods applied make the use of very reliable control instruments imperative in automatic canning. Processing operations from thermostatic control of seaming machines in the manufacture of the cans, to the moment when the latter are stored for shipment, is supervised by a great number of automatic controllers for each phase of the canning process.

Modern hot water blanchers are invariably automatically controlled, otherwise the danger of a mushy product having an overcooked flavour and a generally lower quality would always be present. The purpose of deactivation of enzymes requires the maintenance of a definite temperature-time relationship during blanching, which varies for different types of vegetables or fruits. To achieve shorter operations by using higher blanching temperatures might cause deterioration of appearance or composition, and correct continuous blanching of vegetables or fruits prior to dehydration, canning, or freezing can be assured only by proper control methods.

Thermostatic control of rotary blanchers follows the method used in Great Britain, namely controlling steam supply to the sparge pipes in the water. Where a rotary blancher has two sparge pipes in the water, one from each end, two control valves and two thermostat bulbs are usually applied since the heat demand on the feed end is considerably greater, owing to the lower temperature of the incoming material. Either two separate thermostatic controllers can be

applied, or a dual controller with circular chart and two pens. The instrument housing for the latter contains two control mechanisms, one for each end of the rotary blancher.

Atmospheric steam blanchers consist of a large enclosure with steam sparge pipes fed from two steam supply pipes, and a conveyor band transports the material between upper and lower rows of steam pipes. An exhaust duct at each blancher end with adjustable damper exhausts the steam.

Thermostatic control is performed in a manner similar to that employed for rotary blanchers, with the additional application of a so-called "averaging" thermostat bulb. It consists of a long small-bore pipe as part of the filled thermometric system, the bulb being installed in a horizontal plane close to the layer of material on the conveyor. By spreading the flexible bulb in suitable form, an average temperature of the steam space is achieved. Spreading of steam is kept as required, with consequent steam savings, and elimination of manual resetting of valves.

Control of Dairy Processing

American automatic control methods for dairy plant are, in general, similar to those used in Great Britain and in certain countries on the European continent, for example, Denmark. Thermostatic control of heat exchangers has received great incentive in Great Britain, and any difference of instrumentation between the two countries is noticed more in the smaller dairy. Because elaborate recording or indicating control instruments are considered an unwarranted expenditure in such cases, non-indicating electrical control systems have been developed. This method of control is applicable to such items as can washers, tubular dairy heat exchangers, calorifiers, and holding tanks.

Control methods operate on the same principle as a thermometer controller working on the two-step mode of control. In practice, either open/shut, or alternatively high/low control methods, may be applied, but it is inevitable that a small temperature fluctuation has to be tolerated by the user of the controlled dairy equipment with two-step control modes. Simple thermostatic control, using a temperature-sensitive thermostat bulb in the liquid, the temperature of which should be controlled, and a motorised steam valve with two positions are widely used for rotary can washers. For tubular heat exchangers, the multi-step mode of control is applied, whereby the control valve in the steam supply can take up several positions between fully open and fully closed, according to control impulses.

In many dairies, where calorifiers are heated by exhaust steam, but have an auxiliary live steam coil installed within the heat exchanger, a single multi-step-controller can be used for live steam control, if the exhaust steam provides the basic heat input. A thermostat bulb is inserted in the hot water outflow from the calorifier, and actuates a motorised control valve in the live steam supply; this valve can take up a multitude of positions, according to the heat demand from the calorifier. Where heat demand often falls below the heat input supplied by the exhaust steam coil, the latter must also be automatically controlled. Usually, an alarm contact thermometer in the calorifier would warn the plant operator to turn off, or to divert inflow of exhaust steam in case of excess temperature of the hot water.

In small American dairies, electrically operated proportional controllers are often used to heat milk ahead of a cream separator up to a desired temperature. A motorised gradual steam control valve automatically varies the rate of steam inflow according to milk temperature. If milk flow is stopped for a time, or if the rate of flow changes, overheating is thus avoided. It is claimed that since the fat content of the separated cream varies with supply temperature, separation of cream of uniform richness results from the above method of control.

(To be continued)

The illustration was supplied by the Brown Instrument Division of the Minneapolis Honeywell Regulator Co. (British associates Honeywell-Brown Co.).

Short-High Canning Process

At the technical meeting held during the twentieth annual meeting of the Fruit and Vegetable Preservation Research Station, Campden, a paper was read by Dr. F. Brown on "The High Temperature Processing of Vegetables." Describing the tests carried out at Campden with six typical vegetables, he said that they were designed to show whether the "short-high" processes would give products of quality superior to the more usual "long-low" processes, and were not intended to cover the bacteriological aspects of processing.

Describing in detail the results obtained with fresh peas and carrots, Dr. Brown said that the "short-high" processes gave rather better colours and flavours. The texture of fresh peas was similar in all the processes, but that of carrots in the "short-high" processes was more like home-cooked carrots.

In a reference to the nutritive aspects of canned vegetables, Dr. Brown indicated that the carotene and vitamin C contents were similar both in the "short-high" and "long-low" processes, but that the latter had an adverse effect on the vitamin B_1 content of the vegetables.

Our Contemporaries

Articles published in our associated journals of the Leonard Hill Group this month include the following:

"Chemical Weed Control," by Dr. W. G. Templeman, "Improved DDT Formulation," and Progress Reports on chemotherapy, fertilisers and plant nutrients, and cosmetic and toilet preparations (*Manufacturing Chemist*).

"Advances in Coal Technology" and "Air Pollution Problems" (*International Chemical Engineering*).

Memorandum on the new Leasehold Property Act (*Building Digest*).

Food Controls in Great Britain

C. G. Daubney, M.Sc., F.R.I.C.

PART V

In the fifth instalment of this series of articles, the author outlines the miscellaneous foods dealt with under the Food and Drugs Acts, the Regulations concerned with animal feedingstuffs, and the prevention of damage by pests.

UNDER the Food and Drugs (Milk and Dairies) Act, 1944, three new Regulations came into operation on October 1, 1949, which affect the whole of the dairying industry of England and Wales. These are The Milk and Dairies Regulations, 1949, The Milk (Special Designation) (Raw Milk) Regulations, 1949, and The Milk (Special Designation) (Pasteurised and Sterilised Milk) Regulations, 1949.

MILK AND DAIRIES REGULATIONS, 1949

(S.I. 1949 No. 1588)

"Milk" means cows' milk intended for sale or sold for human consumption or intended for manufacture into products for sale for human consumption and includes cream, skimmed milk, and separated milk.

Under the new Regulations the Ministry of Agriculture and Fisheries registers all the dairy farms and dairy farmers and controls the conditions under which milk is produced. Local authorities are, however, responsible as regards the distributors of milk and for administering precautionary measures to prevent milk becoming infected with disease communicable to man.

Provision is made for any necessary inspection of cattle by a veterinary inspector, who may take samples of milk for examination.

The Regulations lay down conditions with regard to the buildings used in connexion with the production and handling of milk and as a general rule the dairy farmer after milking shall without any delay, other than that caused by any process of straining or centrifugalisation to which the milk may be subjected, cause the milk to be cooled either

(*a*) to a temperature not exceeding 50° F., or

(*b*) if the temperature of the water supply available for cooling is 45° F. or above, to a temperature not more than 5° F. above the temperature of the water supply.

Further, the milk on receipt by the distributor must as a general rule be cooled to the same temperature. Any milk which is infected or suspected of being infected can be diverted for heat treatment.

Provision is also made for the protection of milk from contamination or infection and for the cleansing of milk storage vessels and distributing vessels.

Cleansing of utensils or appliances with an approved chemical agent as an alternative to scalding with boiling water is permitted. At present the only approved agent is sodium hypochlorite. Such solutions are marketed under a variety of trade names.

MILK (SPECIAL DESIGNATION) (RAW MILK) REGULATIONS, 1949

(S.I. 1949 No. 1590)

"Milk" means raw milk and "raw milk" means cows' milk which has not been treated by heat, but does not include cream or separated, skimmed, dried, condensed, or evaporated milk or buttermilk.

The only permitted designations which may be used are "Tuberculin Tested" and "Accredited." The use of the designation "Accredited" will not be permitted after October 1, 1954, and no new licences for the use of such a term will be granted after September 30, 1952.

The use of the designation "Tuberculin Tested" in respect of milk from a non-attested herd will not be permitted after September 30, 1957, and no new licences for the use of such a term will be issued after September 30, 1954, unless the herd in respect of which the licence is applied for is attested.

The conditions under which licences are granted for the use of the special designations "Accredited" and "Tuberculin Tested" include the subjection of samples of milk to the methylene blue reduction test.

This test, in brief, consists of heating a mixture of 10 ml. of milk and 1 ml. of methylene blue solution in a closed tube at 37°-38° C. in a water bath. The milk sample satisfies the test if between May 1 and October 31 it fails to decolorise the methylene blue in 4½ hours or if between November 1 and April 30 it fails to decolorise the methylene blue in 5½ hours. Full details of the test are given in the Order.

MILK (SPECIAL DESIGNATION) (PASTEURISED AND STERILISED MILK) REGULATIONS, 1949

(S.I. 1949 No. 1589)

"Milk" means cows' milk but does not include cream or separated, skimmed, dried, condensed, or evaporated milk, or buttermilk.

"Raw Milk" means milk which has not been treated by heat.

The only permitted designations which may be used are "Pasteurised" and "Sterilised" and where the appropriate licences are held the designations "Tuberculin Tested Milk (Pasteurised)" and "Tuberculin Tested Milk (Sterilised)" may be used.

Milk bearing any of these designations must be kept apart from all other milk unless it is in separate sealed containers. Vessels and appliances used for any other milk must be cleaned in the man-

In each instance, the number of the principal Order and of the latest amendment (if any) is given.

The significance of any Order is, of necessity, bound up with the definition of the food in question. Most of the definitions are given in full, but those which have been abbreviated are marked with an asterisk.

ner prescribed by the Milk and Dairies Regulations, 1949, before they are used for the milk to which the licence applies.

For pasteurisation the milk shall be:

(*a*) retained at a temperature between 145°-150° F. for a least 30 minutes and immediately cooled to not more than 50° F.; or

(*b*) retained at not less than 161° F. for at least 15 seconds and immediately cooled to not more than 50° F.; or

(*c*) retained at such a temperature for such period as stated on the licence.

The pasteurising apparatus, including the cooler, must be constructed so as to secure protection of the milk from risk of atmospheric contamination by dust, etc., and the temperature control must be automatic. Further, a device must be fitted whereby milk which does not reach the required temperature of 150° F. is automatically diverted.

After pasteurisation and before delivery to the consumer, the milk must satisfy the phosphatase test or the methylene blue test according to the time and storage conditions existing between sampling and testing.

For sterilisation the milk shall be:

(*a*) Filtered or clarified, homogenised, and heated to and maintained at such a temperature, not less than 212° F., for such a period as to ensure that it complies with the turbidity test before delivery to the consumer.

(*b*) Treated as above in bottles in such a manner that on completion of the treatment the bottles shall be sealed with an airtight seal.

The Regulations lay down the procedure for sampling, transport, and identification of samples.

Phosphatase Test for Pasteurised Milk

The Regulations stipulate the treatment of samples on arrival at the laboratory prior to test.

The test, in brief, consists of mixing 0·5 ml. of milk in a tube with 10 ml. of a buffer substrate containing a solution of disodium phenylphosphate and sodium veronal in water saturated with $CHCl_3$. Three drops of $CHCl_3$ are then added, the tube is stoppered and after mixing, is incubated at 37±1° C. for 24±2 hr. The contents of the tube are cooled and treated with 4·5 ml. of a test solution containing Folin and Ciocalteu's phenol reagent and sodium hexametaphosphate solution, standing for 3 minutes and filtering. To 10 ml. of the filtrate in a tube 2 ml. 14 per cent. Na_2CO_3 solution are added, and after mixing, the tube is held for 2 minutes in a boiling water bath.

The blue colour which develops is measured together with that produced in suitable controls; the test shall be deemed to be satisfied by milk which gives a reading of 2·3 Lovibond blue units or less.

Full details of the test are given in the Regulations.

Methylene Blue Test for Pasteurised Milk

Details are given of the treatment of samples on arrival at the laboratory, prior to test.

The test is carried out in a manner similar to that described under raw milk and shall be deemed to be satisfied by milk which fails to decolorise methylene blue in 30 minutes.

Turbidity Test for Sterilised Milk

Samples may be examined at any time after delivery at the laboratory but shall be at room temperature when the test is begun.

The test, in brief, consists in dissolving 5 g. of $(NH_4)_2SO_4$ in 20 ml. of the milk sample in a conical flask and filtering the mixture. Five ml. of the clear filtrate are heated in a tube in a boiling water bath for 5 minutes. After cooling, the liquid is examined and the test shall be deemed to be satisfied by milk which at this stage shows no sign of turbidity. Full details of the test are given in the Regulations.

MILK (SPECIAL DESIGNATIONS)(SPECIFIED AREAS) ORDER, 1951

(S.I. 1951 No. 1358)

In the Food and Drugs (Milk, Dairies, and Artificial Cream) Act, 1950, Section 19 relates to the compulsory use of special designations for retail sales of milk. This section has now come into operation in London and its vicinity, and in Portsmouth and its vicinity.

Miscellaneous Foods

Under the Food and Drugs Act, 1938, certain miscellaneous foods are dealt with.

FOOD AND DRUGS (WHALEMEAT) REGULATIONS, 1949

England (S.I. 1949 No. 404; 1950 No. 189); Scotland (S.I. 1949 No. 870; 1950 No. 198)

These Regulations prohibit the importation of whalemeat for human consumption unless it is certified as having been produced in accordance with conditions satisfactory to the Ministry of Food; the Regulations also include provisions designed to prevent contamination of the whalemeat during transport and exposure for sale.

Other Regulations made under the Food and Drugs Act, 1938, include The Public Health (Meat) Regulations (S.R. & O. 1924 No. 1432; S.I. 1948 No. 1119; The Public Health (Imported Food) Regulations (S.R. & O. 1937 No. 329; S.I. 1948 No. 1121); and The Public Health (Shellfish) Regulations (S.R. & O. 1934 No. 1342; S.I. 1948 No. 1120).

Animal Feedingstuffs

The control of animal feedingstuffs falls under two sets of Regulations:

A. The Fertiliser and Feedingstuffs Act, 1926.

B. Feedingstuffs Orders under the Defence (General) Regulations, 1939.

The Fertilisers and Feedingstuffs Act, 1926, is the third of such Acts, which originated in 1893 and owed its inception to serious frauds in the fertiliser trade. The scope of the 1926 Act is defined in its accompanying schedules and is arranged under five headings: civil liabilities, criminal liabilities, administrative provisions, legal proceedings, and general.

For practical purposes, however, this Act only came into force in 1928 with the issue of the Fertiliser and Feedingstuffs Regulations, 1928. These were revoked and replaced by the Fertiliser and Feedingstuffs Regulations, 1932 (S.R. & O. 1932 No. 658). An amending Order was made in 1942 (S.R. & O. 1942 No. 2495) making further alterations and additions to the schedules.

Under the Defence (General) Regulations, 1939, the Minister of Food has made four Feedingstuffs Orders whereby control of animal

feedingstuffs is exercised at every stage from manufacture to retail sale. These Orders are concerned with ingredients used, composition, buying and selling, prices, and the quantities to be sold against the surrender of ration documents.

A. FERTILISER AND FEEDINGSTUFFS ACT, 1932

The Schedules defining the scope of the Act are set out as follows:

Schedule I.—List of fertilisers and feedingstuffs to which all the provisions of the Act are applicable.

Schedule II.—List of fertilisers and feedingstuffs to which only some of the provisions of the Act are applicable.

Schedule III. — Ingredients in feedingstuffs the presence of which must be declared.

Schedule IV.—Definitions implied on the sale of articles under certain names.

Schedule V. — Deleterious ingredients in feedingstuffs.

Any person selling a First or Second Schedule article must give with the sale a statutory statement containing the name of the article, the particulars prescribed in the Schedule in relation to that article, and the name of any ingredient contained in a feedingstuff which is included in the Third Schedule. This Third Schedule is a list of generally worthless ingredients whose presence must be disclosed. The prescribed particulars in the case of feedingstuffs include the content of oil, albuminoids, sugar, fibre, phosphoric acid, and salt.

The Fourth Schedule defines the fertilisers and feedingstuffs that are scheduled articles and the Fifth Schedule lists deleterious ingredients that it is an offence for feedingstuffs to contain.

The statutory statement is, in effect, a warranty and for a feedingstuff, implies that it is suitable for the purpose.

The purchaser of any of these products is entitled to have a sample taken for analysis by an agricultural analyst and there are provisions for both civil and criminal proceedings in the event of infringements of the Act.

An important feature of the Act is the requirement that Regulations must be made for "prescribing anything which under this Act is required or authorised to be prescribed and generally for carrying the Act into operation." These Regulations are now embodied in the revised Fertiliser and Feedingstuffs Regulations, 1932.

FERTILISERS AND FEEDINGSTUFFS REGULATIONS, 1932

(S.R. & O. 1932 No. 658; 1942 No. 2495)

These Regulations, in so far as they relate to feedingstuffs, are set out as follows:

(*a*) *Limits of variation.*—This provision states the variation permitted in the oil, albuminoids, and fibre (where applicable) content of named individual or compounded feedingstuffs.

(*b*) *Manner of taking samples.*—Details are given of the method of selecting samples, the quantity to be taken, the method of dividing, sealing, and marking samples, and the requirements to be observed as to the care and destination of such samples in the event of legal proceedings being instituted.

(*c*) *Methods of analysis.*—Since feedingstuffs can be sold on a basis of price varying according to the ingredients present, and legal proceedings instituted for deficiencies, it is essential that prescribed methods of analysis are available. The Regulations set out in detail the procedure to be followed for the preparation of the sample, and for the determination of moisture, oil, albuminoids (protein), phosphoric acid, fibre, sugar, salt, sand, siliceous matter, and other insoluble mineral matter.

(*d*) *Qualifications of the agricultural chemist.*

(*e*) *Form of certificate of analysis.*

(*f*) *Certain variations to the Schedules to the Act.*

B. FEEDINGSTUFFS ORDERS

Four main Orders, made under the Defence Regulations, operate at the present time. These are the Feedingstuffs (Manufacture) Order, 1950; the Feedingstuffs (Licencing) Order, 1950; the Feeding Stuffs (Prices) Order, 1951; and the Feedingstuffs (Rationing) Order, 1941.

Manufacture (S.I. 1950 No. 1988; 1951 No. 1135)

"Animal Protein Rich Substance" means any substance derived from any animal or fish and containing not less than 40 per cent. albuminoids (protein).

"Cereal" means wheat, maize, barley, oats, rye, dari, peas, lentils, and beans and any other pulse or grain.

"Compound" means (*a*) any feedingstuff for livestock, in cake, meal or any other form (other than a concentrate) which contains not less than four of the ingredients specified in Part A of the First Schedule to this Order in proportions of not less than 5 per cent. each and which contains not less than 2½ per cent. oil and 12 per cent. albuminoids (protein); provided that a different variety or quality or a different product or by-product (of whatever variety or quality) of the same ingredient so specified shall not for the purposes of this definition constitute another ingredient; and (*b*) National Poultry Balancer Meal.

"Concentrate" means any feedingstuff for livestock which contains not less than four of the ingredients specified in Part B of the First Schedule to this Order and which is manufactured for the purpose of being mixed with other substances for the production of a complete ration for feeding to livestock.

"'D' Flour" means flour designated as such by or on behalf of the Minister.

"Feedingstuff" means any substance or mixture of substances which is used as food for any animal or fish including any pigeon, poultry, or game-bird but not including any other bird.

"Fine Wheatfeed" means wheatfeed, of which the fibre content does not exceed 7½ per cent. at 15 per cent. moisture.

"High Protein Oilseed Cake" means oilseed cake, oilseed cake meal, or extracted oilseed meal (or any one or more of them) containing more than 35 per cent. albuminoids (protein).

"Livestock" means horses,

mules, asses, cattle, sheep, pigs, goats, and poultry.

"Livestock Mixture" means any mixture which is used as food for livestock but does not include any compound or concentrate.

"Low Protein Oilseed Cake" means oilseed cake, oilseed cake meal, or extracted oilseed meal (or any one or more of them) containing less than 22 per cent. albuminoids (protein).

"Medium Protein Oilseed Cake" means oilseed cake, oilseed cake meal or extracted oilseed meal (or any one or more of them) containing not less than 22 per cent. and not more than 35 per cent. albuminoids (protein).

"Molassed Feedingstuff" means a livestock mixture which contains not less than 30 per cent. molasses.

"National Poultry Balancer Meal" means National Poultry Balancer Meal which a person is authorised to manufacture under and in accordance with the terms of a licence granted or continuing to have effect under this Order.

"Poultry" means chickens, fowls, ducks, turkeys, guinea fowls, and geese.

*"Wheat By-products" means by-products obtained in the production of flour by milling and includes millers' offals and wheat offals, both as defined in the Fertilisers and Feedingstuffs Act, 1926, as amended, and fine wheatfeed, straight run bran, coarse bran, fine bran, pollards, middlings, and wheat germ.

A licence is required to manufacture any feedingstuff, but there is no restriction on:

(i) The processing of oilseeds, sugar beet, cereals, or vegetables for industrial purposes or for human food notwithstanding that any by-products from these processes would constitute a feedingstuff.
(ii) The manufacture of kitchen waste and dried blood.
(iii) The manufacture of feedingstuffs for a grower from cereals of his own growing.
(iv) The use of grass and other green fodder, hay and straw, and slaughterhouse offals.

A licence is required to manufacture compounds or livestock mixtures for cattle, horses, pigs, and poultry and concentrates and the required ingredients of the compounds and livestock mixtures are set out in a schedule. Furthermore only permitted ingredients may be used in manufacturing compounds and concentrates and certain ingredients including dried milk powder, and feeding bone flour, etc., may be used only in the manufacture of certain of the compounds or concentrates.

Under the heading of "Compounds" is included a list of

(i) products or any by-product thereof which contains not more than 16 per cent. by weight of fibre, such as certain cereals and legumes and dried potato products;
(ii) cake, meal, or extracted meal from various oil seeds;
(iii) meat and fish meal, licensed concentrates, molasses, rice bran, whalemeat meal, and wheat by-products.

Under the heading of "Concentrates" is included cod liver oil and other vitamin potent oils; dried grass meal (including alfalfa, lucerne, clover meal, and other similar meals) containing not less than 13 per cent. of protein; dried liver meal (including dried whale liver meal); dried milk products; dried yeast; feeding meat meal (including feeding meat and bone meal and feeding dried blood); fish meal (including herring meal); high protein oilseed cake; whalemeat meal (including whalemeat and bone meal); and wheat germ.

Licensing (S.I. 1950 No. 138; 1950 No. 1134)

This Order controls the buying and selling of specified feedingstuffs.

Prices (S.I. 1951 No. 494; 1951 No. 2037)

This Order sets out the maximum prices for scheduled feedingstuffs.

Rationing (S.I. 1949 No. 1584; 1951 No. 1137)

"Rationed Feedingstuff" means any feedingstuff specified in the First Schedule to the Order. This schedule lists: (A) 41 different items covering cereals, certain beans, coconut and palm kernel cake or meal, molasses, potato products, suger beet pulp, and tapioca root; (B) 15 different items covering oilseed cake or meal, distillers' grains, meat and fish products, whale products, and wheat gluten meal; (C) dried milk products; (D) a mixture containing a rationed feedingstuff.

The definition excludes:

(i) Certain salvaged feedingstuffs.
(ii) Certain screenings.
(iii) Molasses supplied for silage.
(iv) Flour sweepings and shakings.
(v) Oat husks, oat husk meal, and oat cockle.
(vi) Certain oat feeds (containing less than 25 per cent. fibre).

The Order provides that rationed feedingstuffs for dairy cows and calves, pigs and poultry, horses, and rabbits (breeding does) shall be obtained only against the surrender of the appropriate ration documents.

Under the Feedingstuffs (Rationing) (General Licence) Orders, 1951 (S.I. 1951 Nos. 745 and 1138), certain ration documents shall alternatively be valid for a limited period for other foods.

PREVENTION OF DAMAGE BY PESTS (INFESTATIONS OF FOOD) REGULATIONS

(S.I. 1950 No. 416)

Section 13 of the Prevention of Damage by Pests Act, 1949, places obligations on persons engaged in the manufacture, storage, transport, or sale of food to inform the Minister of Agriculture and Fisheries or the Secretary of State for Scotland of any infestation by pests of premises, vehicles, food, or other goods.

The Regulations however relax or exclude these obligations where that is expedient and place restrictions on the delivery of infested food and other goods so as to enable infestation by pests to be controlled.

"Infestation" means the presence of rats, mice, insects, or mites in numbers or under conditions which involve an immediate or potential risk of substantial loss of or damage to food.

NOTE. — *The foregoing instalment concludes this series. Linked up with it, a further article, describing analytical methods, will be published in the next issue.*

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

A Survey of World Meat Production

WORLD meat production rose substantially during 1950 to above the pre-war level but consumption in the major producing countries also increased sharply during the war, according to a report* just published by the Commonwealth Economic Committee. As a result international trade in meat declined and was about 20 per cent. lower than in 1938. Although Commonwealth exports of beef and veal as well as of mutton and lamb showed some reduction during 1950, those from foreign countries (especially in South America) fell more heavily, and the Commonwealth share of world exports rose accordingly. Commonwealth countries supplied about one-half of the United Kingdom's imports of meat and offal in 1949-50, compared with about three-fifths in 1948 and two-fifths before the war.

Output of beef and veal in Australia, the United Kingdom, and Argentina continued to increase in 1950 and in New Zealand the downward trend apparent for some years was reversed, but in North America there was a slight fall in output. Mutton and lamb production in the main countries concerned, except New Zealand and the United Kingdom, fell appreciably during the year. As European pig herds had been largely rebuilt in 1949, the further expansion in numbers during 1950 was reflected in increased pig meat output which was paralleled in North America, especially the United States.

World exports of beef fell heavily from 82 per cent. of the pre-war level in 1949 to only 58 per cent. in 1950 mainly because of a heavy reduction in shipments from Argentina; trade in mutton and lamb, which had shown some recovery in 1949, also fell appreciably and although about as great as in 1938, was lower than in other post-war years, as bad weather and high wool prices resulted in smaller shipments from Australia and those from Argentina were sharply reduced.

With the continued expansion in European exports, world trade in bacon rose in 1950 while world exports of pork also showed an increase, again mainly as a result of higher shipments from European countries.

World exports of canned meat in post-war years have remained consistently above the pre-war total but in 1950 were only about two-fifths of the record 1946 level.

Exports of beef from Commonwealth countries, which before the war accounted for about one-quarter of the world trade, rose to about 38 per cent. in 1950 as the decline in Commonwealth supplies was not as marked as that for other countries. Two Commonwealth countries, Australia and New Zealand, accounted for about 84 per cent. of the total trade in mutton and lamb in 1950, rather more than the pre-war proportion.

Shipments of bacon from Canada in 1950 remained at about the preceding year's level but as those from European countries increased considerably the Commonwealth proportion of world trade fell to some 15 per cent. as compared with 20 per cent. in both 1949 and before the war.

Per caput consumption of meat in the major exporting countries has shown a marked trend in recent years; in Australia and New Zealand, however, consumption was still less than before the war, but in Argentina there has been a large increase, all in beef. In the United States consumption since 1948 has remained virtually unchanged at 145 lb. a year as against 127 lb. before the war while in Canada, there was a decline in 1950 although *per caput* consumption was still 13 lb. higher than in 1938.

In the United Kingdom, meat consumption in 1950 was appreciably higher than in 1948-49 and totalled about 97 lb. compared with 119 lb. before the war.

* *Meat*. Pp. 103+xi. Published for the Commonwealth Economic Committee by H.M. Stationery Office. Price 5s. net.

Oxidised Flavour of Milk

A PAPER by T. L. Forster and H. H. Sommer (*Journal of Dairy Science*, **34**, 10, 992) on "Manganese, Trypsin, Milk Proteins, and the Susceptibility of Milk to Oxidised Flavour Development" describes work carried out by the authors. Their results are in substantial agreement with earlier findings but offer additional evidence that some constituent of milk serum must be involved in determining the susceptibility of milk to oxidised flavour development.

A concentration of 10^{-1} moles per litre of added manganese sulphate was found to prevent development of an oxidised flavour in "spontaneous" milk and in susceptible milk containing 10^{-5} moles per litre of added copper sulphate. Addition of the manganese salt either before or after pasteurisation was equally effective. Such addition, however, had no effect on the rate of oxidation of ascorbic acid.

The addition of ascorbic acid (100 mg. per litre) to washed cream induced development of an oxidised flavour during 48 hr. storage at 40° F. The presence of added copper sulphate (10^{-5} moles per litre) showed no tendency to catalyse development of the flavour in washed cream. Manganese sulphate, when added to washed cream containing ascorbic acid, did not prevent oxidised flavour development.

The action of pure trypsin retarded or prevented development of an oxidised flavour in spontaneous and susceptible milk. The suggestion is made that the protective action obtained by treating milk with the pancreatic enzyme preparations presently being marketed is due to the trypsin contained therein.

A possible mechanism by which milk proteins may function as reducing agents, through their "fixed" or reactive $-SH$ groups, is discussed. The suggestion is made that these $-SH$ groups in milk proteins may have a pronounced influence on the susceptibility of milk toward oxidised flavour development.

News from the Industry

FORTHCOMING EVENTS

The Society of Instrument Technology

The 1952 programme for the Society of Instrument Technology is as follows:

January 29. Joint Meeting with Control Section. "Some Mechanical Considerations in the Design of Electrical Servo Systems," by Professor A. Tustin of Birmingham University.

February 26. "Temperature Pocket Lags," by Mr. W. Fishwick of Edinburgh University.

March 25. "The Design and Application of a Portable Electrostatic Watt Meter," by Mr. F. R. Axworthy, A.M.I.E.E., of Everett Edgcumbe, Ltd.

April 29. "Why the Human Operator?" by Dr. W. E. Hick of Cambridge University (Joint Meeting with Control Section).

May 27. Annual General Meeting, followed by a paper by Mr. E. W. Taylor of Cooke, Troughton and Simms entitled "Recent Advances in the Industrial Use of the Microscope."

These meetings will be held in the lecture theatre of the Royal Society of Tropical Medicine and Hygiene, Manson House, Portland Place, London, W.1., at 6.30 for 7 p.m., with the exception of the May meeting which commences at 6 p.m.

*

Society of Chemical Industry

The 1952 syllabus of the Microbiology Group of the Society of Chemical Industry includes the following meetings:

Jan. 9. Symposium on Disinfection. A joint meeting with the Society for Applied Bacteriology.

Mar. 26. "Bulk Cultivation of Microorganisms," by Dr. D. W. Henderson, and the annual general meeting of the Group.

Apr. 17. Soil Nitrogen Status. A joint meeting with the Agriculture Group and the British Society of Soil Science.

*

Institute of Refrigeration

Sessional papers to be read during 1952 are:

Jan. 22. "Quick Freezing," by W. V. Smedley.

Jan. 30. Annual Dinner at Savoy Hotel.

Feb. 26. "Mechanical Handling applied to Refrigeration," by L. R. Meyer.

Mar. 25. "The Effect and Removal of Non-condensible Gases from Ammonia Plants," by E. S. Green and J. C. E. Lowcock, B.Sc.

Apr. 29. "Plastics from the Viewpoint of the Refrigeration Industry," by V. E. Yarsley, D.Sc. (Zurich), M.Sc. (Birmingham), F.P.I., F.R.I.C.

These meetings will be held at the Institution of Mechanical Engineers at 5.30 p.m.

Royal Institute of Chemistry

Included in the programme of meetings arranged by the Royal Institute of Chemistry for January are the following:

Jan. 24. "Luminescence in Inorganic Chemistry," by C. G. S. Hill, B.Sc., A.R.C.S. (with the Acton Technical College Chemical Society) at 7.30 p.m. at the Acton Technical College.

Jan. 31. "The Separation of Gases by Low Temperature Methods," by J. B. Gardner, B.Sc., Ph.D., A.R.C.S., D.I.C., F.R.I.C. (with the Battersea Polytechnic Chemical Society) at 7 p.m. at the Battersea Polytechnic.

Microchemical Methods

Designed to survey the principal branches of chemistry in which small-scale methods have been successfully applied, a course of 12 lectures and appropriate practical work will be held on Saturday mornings from 9.15 a.m. to 12.30 p.m. at the L.C.C. Norwood Technical College, commencing on January 12.

Lectures will be illustrated by demonstrations and will deal with the scope, aims, and achievements of small scale techniques; design and construction of simple apparatus; organic and inorganic preparations on a reduced scale; simple chemical microscopy; inorganic qualitative analysis; volumetric and gravimetric analysis on a reduced scale; organic qualitative and quantitative analysis; physicochemical methods of analysis; and microtechniques for the determination of molecular weight.

Application forms for admittance to the course may be obtained from the Secretary of the College. The London fee for the course is £1, and a laboratory deposit of £1 (returnable in whole or in part at the conclusion of the course) is payable.

OBITUARY

Dr. H. E. Cox, F.R.I.C., Consulting Analytical Chemist, on November 21, as the result of a street accident.

Dr. Cox, who joined the Society of Chemical Industry in 1918, was a member of Council, a member of the Publications Committee, Chairman of the Scientific Journals Sub-Committee, and a member of the Finance Committee. He was a Vice-President from 1941 to 1944, and became Hon. Secretary of the London Section in 1929, continuing in that office until 1935 when he became Chairman of the Section from 1935 to 1937. He was a member of Council from 1938 to 1941 and again from 1950 until his death. He was intimately connected with the foundation of the Food Group of the Society and was a member of the inaugural committee in 1932, becoming Chairman in 1942 to 1945. His publications included *The Chemical Analysis of Foods* (3rd edition, 1946) and *Foods—Composition and Analysis*.

An appreciation of Dr. Cox will be published in a forthcoming issue of FOOD MANUFACTURE.

*

Mr. W. H. Gaunt, C.B.E., J.P., a director of J. Lyons and Company, aged 77.

Mr. Gaunt, who was chief of the Lyons transport system, was probably the greatest expert on commercial transport in the country and was a champion of British canals—their maintenance and development.

He was Director of Transport in the Ministry of Food in 1940, and a member of Lord Reith's Council for Physical Planning and Reconstruction in 1941. He was also chairman of the Thames Barrage Association and a one-time President of the National Housing and Planning Council and of the Mansion House Association on Transport.

Refrigeration on Show

A new showroom was opened for the Manchester branch of Prestcold Refrigeration by Mr. M. A. H. Bellhouse, assistant managing director of Pressed Steel Co. At the ceremony were present representatives of the Board of Trade; North-western Electricity Board; Ministry of Supply; Ministry of Works; Ministry of Food; British Refrigeration Association; and various leading trade organisations.

Acids in Bread

A paper of interest to food chemists by Hugh C. Moir and Miss A. Kerr on "The Chromatographic Determination of the Acids in Bread" was presented at a recent meeting of the Scottish section of the Society of Public Analysts and Other Analytical Chemists.

This paper described a method of extraction of the acids from bread and subsequent separation by partition chromatography on a silica gel column. Individual acids are then determined by titration. Formic, acetic, butyric, and lactic acids are principally encountered, although mention has been made in the literature of the occurrence of propionic, succinic, and pyruvic acids. Results were given for different types of bread.

Members and guests watch a demonstration of cake decoration.
Leonard Hill photograph.

Food Group Conversazione

The fifth annual conversazione of the Food Group of the Society of Chemical Industry was held, jointly with the Agriculture Group, on November 14, 1951. This was held at Sussex House, Queen Street, London, by kind permission of the Board of Directors of Craigmillar and British Creameries, Ltd. Members and guests, who numbered over 200, were received by Prof. H. D. Kay, C.B.E., D.Sc., F.R.S. (chairman of the Food Group), and Mrs. Kay, and Mr. Clive Van den Bergh, M.B.E., managing director of Van den Berghs and Jurgens, Ltd., and Mrs. Van den Bergh.

As a part of a full programme tours were made through the bakeries, kitchens, and laboratory, the demonstrations of the decoration of cake fancies and gateaux arousing particular interest.

The facilities existing at Sussex House are controlled by three different groups of associated companies. Because of certain common interests and requirements it was decided to house the bakeries and kitchens in one building, the broad divisions being:

Craigmillar and British Creameries, Ltd. (bakery margarines and shortenings) with experimental and research bakeries, catering and ice cream development rooms, and laboratory.

Van den Bergh and Jurgens, Ltd. (Stork margarine and Spry cooking fat) with a Stork experimental kitchen.

T. Wall and Son Ltd. (ice cream and meat products), *MacFisheries, Ltd.* (fish and game), *Birds Eye Frozen Foods, Ltd.* (deep frozen fruit and vegetables), and *Batchelor Peas, Ltd.* (canned peas and fruits and chicken noodle soup) with a food group kitchen.

The CBC Service Bakery of Craigmillar and British Creameries, Ltd., has three sections: an Experimental Bakery where day-to-day queries on recipes and baking problems of all kinds are dealt with; a separate Research Bakery dealing with more fundamental needs and long term baking problems (these two are used for small scale experiments); and a large scale Bakery where such experiments are confirmed on a commercial scale.

Members visited the Catering Room and Ice Cream Room with its cold store which deals with subjects allied to the baking and catering industries.

In the Stork Kitchen of Van den Bergh and Jurgens, Ltd., were seen equipment of the domestic type. The food group kitchen, modelled on the Stork Kitchen, was then inspected. Covering as it does a wide range of food—from fish to ice cream—its activities are diverse. It is concerned with the domestic use of the products, its main purpose being to make the products more attractive and to find new methods of presentation.

Finally, the members visited the Tasting Room, which has been equipped in novel fashion. It contains five tasting cubicles in which personnel of special tasting panels are enclosed. Coloured lights "kill" the natural colour of the goods, which are passed to the tasters through hatches, so that they can concentrate upon tasting.

To those who took part in the Food Group tour to Italy, the film show was one of the high spots of the evening.

The excellent organisation of the hosts was further exemplified by the efficient buffet service given to the large number of appreciative guests.

Once again the organisers of the conversazione must be congratulated on their latest success.

Warehouses for Traders

It has long been the practice for the railways to provide self-contained buildings in goods yards and at outlying stations, to be rented by private traders for the storage of grain and other commodities.

Hitherto, each company had their own standards but in furthering the needs of the trader, the Railway Executive has produced a standard store for all Regions, the prototype of which has now been erected at Waterloo for exhibition to traders, commercial representatives of all Regions, and all others concerned.

In order to overcome the serious shortage of building materials, the structural design is entirely of precast concrete and embodies a unit platform and floor, with posts and rafters cast as one unit which give clear cut internal lines, wall panels, purlins, and roof units. Alternatively, the roof cladding may be of asbestos sheeting as shown in the prototype.

The store is available in two widths, 20 ft. and 13 ft. 6 in.; the minimum length supplied is 20 ft. but this may be extended as desired in units of 6 ft. 6 in. A compound store may be formed of any combinations of the two widths, and doors and windows can be arranged in any panel to suit the trader.

The basic store is supplied with the walls lined with timber battens, Perspex sheeting roof-lights, and a canopy over the unloading dock on the rail side. Duck-boards covering about 70 per cent. of the floor area may be added if so desired.

Well ventilated by means of fluted floor slabs and gable louvres, the store is vermin proof.

Food from Bones

The gas heated bone digestor, the Millwall No. 1 (J. Fraser and Son) exhibited at the Smithfield show by the Gas Council, makes possible the recovery of valuable jelly, fat, and bone meal from bones and other scrap material on a scale not hitherto possible for the smaller user. It is equally suitable for the cooking of meats, hams, offals, etc., and a similar model may be used for sterilising foods packed in cans.

The bones are placed in galvanised wire mesh baskets inside the digestor, and cooked by steam at pressures up to 35 lb. per sq. in. The liquor that collects in the bottom is drawn off by a drain cock after processing. The gas supply is automatically controlled to maintain the correct pressure.

Changes of Address

The change of address reported by W. and J. George and Becker in the November issue of FOOD MANUFACTURE refers only to their London Area sales and export offices, and warehouse. The company's premises at Birmingham remain unaltered.

*

From January 1, the address of Mr. L. D. Galloway, Consultant Industrial Microbiologist, will be changed from 24, Welbeck Way, London, W.1, to 36, St. James's Street, London, S.W.1.

B.B.I.R.A. Annual General Meeting

FLOUR AND BREAD IMPROVERS DISCUSSED

The fifth annual general meeting of the British Baking Industries Research Association was held in London on November 8, 1951, followed by a lunch at the Trocadero.

The report of the Council, which covers the period from July 1, 1950, to June 30, 1951, reviews the progress which has been made and the facilities now available to the baking industry.

During that period official recognition of the Association has been fully established giving the industry technical representation at levels previously denied to it.

The closest technical consultations have been conducted between the Research Association and the Ministry of Food in connexion with a large number of problems.

The Director of Research, Dr. J. B. M. Coppock, serves on a Committee of the Medical Research Council considering food additives. The Research Association is represented by Mr. Cannon and the Director on a technical sub-committee set up by the Ministry of Health to consider the composition of the post-war loaf.

Further progress has been made during the year towards the goal of prescribing standards for materials and ingredients used by the baking industry.

A full research programme for the year 1951-1952, together with a report on progress to date, is contained in the report.

After the lunch, presided over by Dr. R. G. Colgate, chairman of the Council, there was an afternoon session at which Dr. Coppock presented an interesting paper on the use of flour and bread improvers. He mentioned the three main classes of chemical substances used, which were (i) those that bleach and improve, *e.g.* agene, chlorine dioxide, and chlorine, (ii) those that bleach only, *e.g.* benzoyl peroxide, and (iii) those that only improve, *e.g.* potassium bromate, ammonium persulphate, and ascorbic acid.

He considered that a distinction should be made between flour improvers and bread improvers. Substances added to flour to improve dough behaviour and bread quality were called flour improvers. Substances added during breadmaking were called improvers.

A great deal of time had been spent at the Research Station examining the precise role that various flour and bread improvers played and in this work the individual effect of each substance had been examined on untreated and unbleached 81 per cent. extraction flour, using flour testing instruments, test baking, and, when occasion had permitted, baking under commercial conditions.

On the basis of this work some broad conclusions regarding flour treatment had been arrived at.

Discussing the use of agene, Dr. Coppock urged caution before sweeping statements were made regarding the effects of traces of toxic substances in any foods unless physiological evidence clearly substantiated the suspected toxic effect.

At the conclusion of the address, Mr. J. J. Devlin, Principal Bakery Officer, said that he had found, during his visits to bakers in the course of his duties, that there was a general tendency to use excessive quantities of bread improvers.

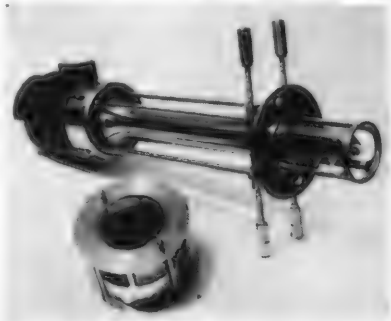
At one bakery he had visited recently flour from three different millers was being used. These flours had been treated by the miller either with potassium bromate or ammonium persulphate and one, owing to its inherent toughness and lack of extensibility, could be regarded as fully treated when it was received by the baker.

Mr. Devlin then referred to a fermentation tolerance test which could be conducted in a bakery, large or small, and explained how this could be done without interrupting the flow of work. He concluded by showing some samples of bread baked with the addition of glyceryl monostearate at various levels to illustrate the deterioration in quality arising from its addition above the very limited quantity recommended by the Research Association.

High Speed Mixing

Manufactured completely in stainless steel, the Watten speed mixing and emulsifying machines are sealed to avoid entry of the mix into the bearings and to prevent the lubricant on the bearings leaking out during processing.

Mixing is effected by an impeller worm driven by an extension from a high speed electric motor. In operation the material to be mixed is drawn up by the impeller from the lower part of the vat and thrown outwards against the sides by a rotating deflector, or splash plate, situated at the bottom of the extension shaft. The mixture strikes against the sides of the vat with considerable force and sinks to the bottom.



The Watten mixing and emulsifying machine.

When it is required to be used as an emulsifier, an emulsifying head with a perforated screen is fixed on to the splash plate to enclose the impeller. When this head is attached, the mixture is emulsified by being thrown outwards and forced through the mesh at a high velocity.

Four models are now being produced, ranging from ½ h.p. to 5 h.p. and including a two-speed machine.

Quality in Mass Production

A team of eight specialists is visiting America to study methods of inspection in practice in American plants engaged in mass production, mainly engineering. It will be led by Mr. Leonard Sollis, managing director of the Highfield Gear and Engineering Co., and has as joint secretaries, Mr. E. D. van Rest of the National Physical Laboratory, Teddington, and the Ministry of Supply, and Dr. John Barnett, technical manager and chief inspector of Thorn Electrical Industries.

Primarily, attention will be focused on the function exercised, or capable of being exercised, by inspection in the organisation of industry at large. Such matters as the status of inspection departments in relation to other departments, the bearing of inspection on testing, the application of electronic tests are also expected to be discussed by the team in the report to be issued in due course.

New Branch to aid Deliveries

Prompt delivery of all their products throughout the whole of East Lancashire is the aim of J. H. Fenner and Co., who have opened a new branch at Burnley to achieve this.

The existing branch at Colne will continue to serve that area, but the much larger and more central premises in Burnley's main industrial thoroughfare will provide the necessary expansion to meet the growing demand for the company's products.

The new branch will be managed by Mr. E. Hardy, who is already widely known for the effective consultation, design, and installation work he has carried out on the large scale conversion of looms to individual drive. Mr. R. Briddock and Mr. C. Sedgwick will also be working from Burnley, while extensive stocks of V-belts, pulleys, textile and leather beltings, and a wide range of power transmission accessories will be carried at the branch.

The new A.P.V. factory begins to take shape.

Laying of Foundation Stone

The foundation stone of the new A.P.V. factory at Crawley New Town was laid by Dr. Richard Seligman, founder and chairman of the company, on November 3, 1951. Founded by Dr. Seligman in 1910, the company has since grown to such an extent that it can no longer be accommodated in its present four factories and production is to be transferred to the larger premises being built at Crawley. The ceremony was attended by over 700 employees and their wives who had travelled down from London in 17 motor coaches.

In an introductory speech, Mr. E. Whitlock, Works Director, spoke of the high esteem which all the workers held for Dr. Seligman and emphasised the exceptional spirit which prevailed in the company owing to the principles which Dr. Seligman had followed in building it up to its present position. This principle, he said, was that of straight dealing, in which each man had his due and all have equal rights to the benefits which accrue from their combined work.

The ceremony of laying the foundation stone was then completed with simple dignity by Dr. Seligman, who in a few words expressed his confidence in the company's future.

At the conclusion of the proceedings, visitors were able to inspect the factory site, on which the steel framework was in process of erection. The new factory is to be completed in two stages, the first of which will be ready by March, 1952, occupying a floor space of 5 acres. The second stage, which will bring the total floor area to over 10 acres, will follow in three or four years.

Erections and Extensions

Plans for the opening of a new shellfish canning factory by Shellfish Preserves at Tolcarne Cannery, Newlyn, Cornwall, are stated to be well advanced, and it is hoped to commence production this month.

The installation of a large deep-freeze unit will ensure all-the-year-round production at a price much keener than that for imported canned shellfish.

*

Extension of their factory is being carried out by Brenton Sausage Co., Liverpool.

*

Extensions to their factory at Bromford Lane, West Bromwich, are being planned by Metal Closures.

*

Plans to establish a new factory on a site at Penmaenan, Pontllanfraith, are being prepared by the Dulcet Confectionery Co.

Dehydrated Onions

The production of onions is second in importance only to the cotton crop in Egypt. The Standard Food Products Company of Egypt has for some time been operating an extensive and up-to-date plant for the dehydration of onions. The Essef brand covers a complete range of kibbled and toasted onions, onion chips, flakes, and slices, and onion powders.

The sole agency in the United Kingdom for the company's lines is held by S.F.P. (Food Products).

Director's Continental Tour

Mr. Brian H. Turpin, technical and sales director of Quickfit and Quartz, manufacturers of industrial and laboratory chemical glassware, and a member of the Triplex group of companies, is to visit France and the Low Countries. He will spend a week in Holland, a week in Belgium, and a short time in the Paris area, during which he will attend the Chemistry and Industry Congress. He will also visit the exhibition of laboratory and scientific equipment and contact his firm's principal clients in these countries.

Measuring Mechanical Quantities

New equipment for measuring mechanical quantities electrically and for indicating the results at a distance has been developed by the Research Laboratories of The General Electric Co. and Salford Electrical Instruments. The system has a very wide range of industrial applications, among which are: gas, liquid, and steam pressures; liquid levels; positional indication, *e.g.* valve indication at remote point; and temperature measurement.

Operation is from alternating current mains and the indications can be transmitted directly over several miles.

This new system is extremely simple and robust, and can be operated and maintained by unskilled personnel. Overall accuracy is high and is unaffected by variations of ambient temperature. Up to 30 per cent. change of voltage and 10 per cent. change of frequency can be tolerated without the indications being affected, neither of these extremes being likely to occur in practice.

Quantities can easily be summated, multiple indicators can be used, and the inclusion of alarms, servo mechanisms, or recorders presents no difficulties.

Operators at work in the Egyptian onion factory.

British Food Research

NEW LABORATORIES OPENED AT LEATHERHEAD

One of the new technical laboratories.

The new laboratories of the British Food Manufacturing Industries Research Association at Leatherhead were officially opened by Lady Engledow on November 8. Prior to the ceremony, Lt.-Col. G. R. Harding, D.S.O., M.B.E., chairman of the Council, introduced members of the Council to Lady Engledow, and the President of the Association, Sir Frank Engledow, C.M.G., F.R.S., addressed the assembled guests.

During the tour of the new premises, visitors inspected the pest control, general research, analytical, and technical laboratories in which investigations were being carried out on bakers' prepared materials, cocoa and chocolate, jam, margarine and compound fats, meat and fish products, pickles and sauces, sugar confectionery, and miscellaneous products.

In the insect and other pest control section some of the insects which may infest imported foodstuffs, such as dried fruits, nuts, and cocoa beans, were on view and a demonstration was given of the methods by which the presence of insects in foods may be detected.

Work in connexion with jam manufacture includes investigations into the causes of breakdown which takes place in strawberries preserved in sulphur dioxide. Methods of estimating enzyme activity of the fruit itself and in the moulds associated with it are being developed for this purpose. Samples of raspberry and strawberry jams, made in the Association's laboratories in connexion with the testing of the suitability of new and other varieties of fruits for commercial jam manufacture, were inspected in this laboratory.

Methods for the determination of particle size in chocolate using sedimentation, microscopical, and sieving techniques were demonstrated in another laboratory in which was also exhibited the apparatus for the measurement of the hardness and plasticity of toffees and other products.

In the meat and fish products section, an investigation was in progress on the effect of various methods of cooking upon the digestibility of meat. Other exhibits in this department related to the separation and shrinkage of meat and fish pastes in small jars, methods for testing the salinity of brines, and a vacuum gauge for testing canned goods. This latter instrument was described in the October, 1951, issue of FOOD MANUFACTURE.

Dr. F. H. Banfield, Director of Research.

Included in the exhibits in the main analytical laboratory was a method of colour measurement used in analysis, the analysis of jams, the determination of sulphur dioxide, the use of the Ridgelimeter for testing jellies, and a high-power centrifuge. A further room in this section was devoted to a demonstration of the use of the microscope in analysis, *e.g.* in identifying the flora in honey, and the identification of fish by their scales, fruits in jams, cocoa shell in cocoa powders, and cereal starches in soup powder.

The Association was formed in 1947 by the amalgamation of two older research organisations and although nominally only in its fifth year its work, which covers a broad field of food processing and preservation, is a continuance of research that has been developed over the past 32 years.

Transparent Films for Packaging

The four broad classes of transparent films used in packaging are cellulose viscose, cellulose acetate, polyethylene, and rubber hydrochloride. In a paper read at a meeting of the Midland Area of the Institute of Packaging, Mr. Charles Lein, sales manager of the Goodyear Company, described the physical and chemical properties of the rubber hydrochloride Pliofilm, the manufacturing technique, and its specific application in the food and other industries.

Film Strip on Bread

Intended mainly for educational purposes, a film strip, produced by Industrial Productions in collaboration with W. H. Nevill Ltd., deals with the production of flour from the sowing of the grain to the milling of the wheat and the manufacturing processes used in the production of bread.

APPOINTMENTS

The Right Hon. Lord Moran, M.C., M.D., F.R.C.P., has accepted the office of President of the Health Congress of the Royal Sanitary Institute, which is to take place at Margate from April 22 to 25, 1952.

*

The appointment of Mr. Gilbert Dodd as deputy manager of the Purchasing Department of Monsanto Chemicals becomes effective on January 1, 1952, when he will transfer his office to the headquarters of the company's Purchasing Department at Abford House, Wilton Road, London, S.W.1.

Mr. Dodd, who has been with the company for thirteen years, is well known in the chemical and plastics industries both at home and abroad.

*

Mr. C. D. Callieu, O.B.E., D.S.C., has been appointed marketing operations manager by Shell Chemicals. He will co-ordinate production and marketing plans with sales service to customers, to achieve the closest possible link between these functions.

Vacuum chamber for food processing.

Vacuum Bell for the Food Industry

To meet the need that frequently arises for a means of impregnating with vapour or of dehydrating materials that cannot withstand high temperatures without deleterious effect, Lacy-Hulbert and Company have developed a chamber in the form of a bell. This apparatus is based on the fact that the vapour point of water in a vacuum of 29/29½ in. Mercury is at approximately the ambient temperature.

One particular application is for the processing of laminated organic material compressed into a bale approximately 4 ft. × 5 ft. In this instance it was essential that the bale should always be handled in an upright position, and it was specified that to avoid damage the bale itself must be subjected to the minimum amount of handling. Storage, transport, and the loading and unloading of the vacuum chamber are effected by placing the bale on a stillage and moving by means of a self-elevating truck. It was, therefore, considered that a chamber in the form of a bell would reduce the risk of damage and lower the handling time to the minimum.

The bell is 5 ft. × 6 ft. and is raised or lowered on to the circular base, which is fitted with a joint ring to make a vacuum tight joint between the base and the bell. The base, which is sunk to a convenient loading level in the floor of the site, is fitted with hinged floor plates which provide a platform for the charge to rest upon and allow easy access for cleaning.

All operations are controlled from a central panel adjacent to the bell and on it are mounted a compound vacuum/pressure gauge, dial thermometer for measuring the temperature of the interior of the bell, and push buttons for controlling the hoist and pump motors.

Two vacuum pumps are employed, one for "roughing" and the other for obtaining the higher vacuum. The roughing pump is driven by a 6 h.p. motor and the finishing pump by a motor of 2 h.p.

Arrangements are made for automatically by-passing the exhaust from the roughing pump until the finishing pump comes into action, thus restricting the maximum power consumption to 6 h.p. A manually operated valve enables the vacuum pumps to be isolated from the bell and carries a safety device to ensure that steam cannot be admitted until they are isolated.

The base of the condenser unit is provided with a large sump from which the condensate can be purged at any time during the process without changing the vacuum or pressure existing in the bell, thus saving considerable operational time.

Although developed for an impregnating process, this apparatus can be used for low temperature dehydration, having all the advantages of quick operation, complete freedom from injury to the charge, and the facility for using normal methods of trucking and handling.

Hammer Crusher

Available in a range of seven sizes for various installations and duties, the British Jeffrey-Diamond rigid hammer crusher can be used for the reduction of such materials as bark, bones, cattle guts, chemicals, coal, and sulphur to small sizes in one operation with a minimum of fines.

The smallest machine, 15 in. × 8 in., will handle two to three tons of coal per hour, while the 42 in. × 48 in. size crushes up to 250 tons per hour.

Gelatine and Glue Research

The official opening of the Research Laboratories of the British Gelatine and Glue Research Association at the premises at Dalmeny Avenue, previously occupied by the British Food Manufacturing Industries Research Association, by Sir Roger Duncalfe on November 29, 1951, marks a well-defined stage in the history of the industry. The main functions of the Association, bearing in mind the limited resources which are available, are as follows:

1. To carry out fundamental research. It is evident that, in an industry in which the units are not very large, few firms are equipped, or can afford the time, to carry out a large amount of fundamental research. This can be very well done on a co-operative basis, and by its very nature it does not need such close contact with works practice. Such fundamental research, although reasonable latitude is necessary to follow interesting sidelines, should have intelligible objectives related to the long term interests of the industry. The programme of the Association has been drawn up on this basis, and the first results of it are already becoming available.

2. To carry out *ad hoc* research. Problems often arise for which the basic data are so inadequate that the fundamental approach would be too complex to be undertaken. It may often be true that a partial solution is all that is required, or that as long as the connexion between some variable and the property of the product is firmly established, the underlying reasons are of minor importance. In these instances a more direct attack is indicated, and the use of statistical methods can be of particular value. The Association is already carrying out work of this type, and the programme allows limited resources for these empirical studies.

3. To act as a scientific centre for the industry. The Association has been particularly successful in achieving this objective. The main factor in securing this has been the Research Panel of the Association which is attended by technical staff of both full and associate members, together with invited representatives of outside organisations.

It was a bold venture in 1948 for a small industry to set up its own Research Association, and to equip and staff its laboratories. A sound decision to place the main emphasis on fundamental research also meant that the industry was prepared to be patient as far as rapid results were concerned.

It has, however, been found that benefits are already being derived from membership of the Association, some of which were not anticipated when it was first planned. The removal of the feeling of isolation experienced by the technical staff of many firms is of particular value.

As membership extends gradually throughout the industry, the services which the Association can render will grow in extent and efficiency, which will be reflected in the technical development in the industry itself, and in the better use of its products.

Monograph on Refrigeration

An addition to current literature on cold storage insulation is a technical monograph on refrigeration insulation by G. Yale Pitts, M.Eng., M.Inst.R.

The subjects dealt with include thermal conductivity; moisture absorption; heat flow; cellular structures; insulated construction; frost-heave; solar radiation; selection of insulant; precautions with concrete; use of asphalt; and airlocks.

Macaroni Products

Foster Clark of Maidstone have announced that they have become sole owners of the business of Alimentary Paste (Great Britain) Ltd. of Oldham. This will in future be managed entirely by Foster Clark, and while all customer contacts will be with them, the A. P. despatches will continue to be made from the Oldham factory, whose macaroni plant is one of the most up-to-date in the kingdom.

B.S.I. Revise Standard

Originally published in 1938, B.S. 767 : 1951—Hydro-extractors has been revised, and has now been re-published under the title "Hydro-extractors and centrifugal machines."

Additionally, the method of calculating the stresses in the basket shell and hoops has been simplified as far as possible, and allowable stresses for the constructional materials have been brought into line with current practice.

In its revised form the standard covers hydro-extractors and centrifugal machines having vertical, horizontal, or inclined shafts, running at speeds from 400 to 3,000 r.p.m. for use in laundries, textile, and other trades. It sets down certain principles governing the design, construction, and operation of hydro-extractors and centrifugal machines used for the extraction of liquids from solids, but it does not apply to high speed centrifuges or separators used, for example, in oil or cream separation plant.

BOOKLETS RECEIVED

A fully illustrated booklet dealing with pneumatic dust conveying and collecting has been issued by the Sturtevant Engineering Co.

*

Full details of the company's high speed mills, carborundum mills, high speed mixing dispersing equipment, and the paste mill range are given in a series of leaflets issued by Premier Colloid Mills.

*

Axial flow fans for corrosive gases and acid recovery plant are the subject of two leaflets which have recently been published by the Kestner Evaporator and Engineering Co.

*

News from their London and Barry works is included in the autumn issue of *The NewsVeyor*, published by J. Collis and Sons.

*

The increasing demand for some form of electric traction for use with existing manually traversed pulley blocks and cranes has resulted in the development of an electric tractor unit. This unit is fully described and illustrated in a leaflet issued by the manufacturers, Geo. W. King Ltd.

*

Base exchange water softeners and ion exchange equipment are the subject of two recent publications issued by The Permutit Co.

*

Details of their short-time pasteurisation plant and its application in the food and dairy industries are included in a booklet issued by The A.P.V. Co.

*

Prepared for school leavers who are taking their first job, a booklet published by Boxfoldia gives a background of general information about the company and the products they make.

*

A simple explanation of the International Colour System for the description of colour and showing its value for colour specification in industry has been issued by The Tintometer Ltd., under the title "The C.I.E. International Colour System Explained," by G. J. Chamberlain.

*

Machinery covering all stages of the Vogt process of continuous ice cream manufacture is described in an illustrated leaflet recently issued by Cherry-Burrell. Items described include equipment for mixing, pasteurisation, homogenisation, cooling, ageing, freezing, and extrusion.

OBITER DICTA

• We don't know how many working families can afford the luxury of canned ham, but we do know something the working man is not prepared to do without, and that is his tobacco. —*"Fulham Chronicle."*

• Clean bread is every bit as important as clean milk. I have seen children dropping unwrapped bread in the street and probably the parents never knew of it.—*Mr. J. R. Griffiths at a meeting of the Nant Conway Rural Council.*

• The "calorie business" is wearing a bit thin. Proof? The experiences of men forced to live on unbalanced diets with excellent results.—*From a talk given by Miss Winifred Jones on the theory and practice of Nature Cure cookery.*

• Of all the shocks we have had since the new Government started to take stock of our national resources, none has hit the average man or woman harder than the terrible truths about our food supplies.—*Mrs. Margaret S. Clark in the "Evening Dispatch."*

• I understand that we do not intend to send food traders to look for the food. I understand we have not the money. Well, someone might pass round the hat at least to pay their fares for them to see if there is anything which can be picked up reasonably cheap.—*Mrs. Mann, M.P.*

• I have seen with surprise and horror that the supply of tinplate to the home canning industry is to be cut by 15 per cent. If food imports are cut, there will be a tremendous increase in the demand for home canned foods.—*Mr. D. Lowe at a council meeting of the National Farmers' Union of Scotland.*

• What has been found out by the constant stream of estimable people who have been crossing the Atlantic and coming back to prepare reports on how it is done there? That the American worker works hard to get more money and with that money he can buy a television set or a motor car. Sour grapes indeed. — *Mr. F. C. Hooper, managing director of Schweppes.*

COMPANY NEWS

A plea that the present world apportionment of available supplies of British made tinplate should be revised at the earliest possible moment to meet the demands of the canning industry was made by Mr. E. Ronald Crammond, who presided at the twentieth annual general meeting of the National Canning Co. in Mr. S. W. Smedley's absence.

After payment of the dividend on the Preference shares, a dividend of 20 per cent. subject to tax was recommended. This is at the same rate as that paid for each year since 1947.

*

Following the publicity recently given to the treatment of flour with Agene, Mr. William P. Webster, chairman and managing director of Wright's Biscuits, in his statement presented at the annual general meeting of the company, said that their millers had assured them that the company's biscuits were produced from flour which was not so treated.

A final Ordinary dividend of 1s. 4½d. per share was recommended by the directors.

World Food News

British Grain Plant for Argentina

The largest grain elevator in the southern hemisphere was formally inaugurated in Buenos Aires, Argentina, on November 2, when General Pistarini, the Minister of Public Works, pressed a switch which started the conveying machinery and sent grain on its way to the storage bins from railway wagons and coastal craft. The Minister then officially handed over the plant to Señor Ares, the Minister of Economics, for operation by the Grain Elevator Commission.

The new elevator is the latest of five large elevators built at the principal grain-shipping ports under the Argentine Government's national elevator scheme. The entire mechanical and electrical machinery and equipment of all five plants has been supplied, erected, and put into operation by Simon Handling Engineers.

The Buenos Aires elevator has a total grain storage capacity of over 150,000 tons, and its equipment includes comprehensive grain cleaning and drying machinery and dust-collecting plant. There are altogether some 250 electric motors giving a total of 7,500 h.p. and about six miles of conveyors.

Grain arrives at the elevator by rail, road, and coastal barge; rail and road vehicles can be discharged at a rate of 2,000 tons per hour, and two travelling pneumatic plants, each of 70 tons per hour capacity, are installed on the quay-side for discharging barges. Grain can be loaded out to ocean-going ships at the rate of 3,600 tons per hour; the shipping gallery, approximately half a mile long, allows five ships to be berthed and loaded simultaneously.

Canning Factory for Singapore

Plans for the building of a canning and bottling plant and a sauce factory in Singapore by the Amoy Canning Corporation (Hongkong) have been approved by the Singapore Municipality. The Corporation plans to run its own farms and orchards to supply the factory.

The company also plans to establish a larger plant at Kuala Lumpur, but this project will not be implemented until the Singapore factory is in production.

Machinery and Metal Products

A review of products manufactured by the Norwegian iron and metal working industry, which are being exported or will be exported in the near future, is contained in a recent publication of the Norwegian Export Council.

Disposal of Citrus Wastes

Research on the disposal of citrus wastes is being actively pursued by the U.S. Department of Agriculture. According to Harry W. von Loesecke, of the Bureau of Agricultural and Industrial Chemistry, in 1930 American growers produced a little more than 80 million boxes of citrus fruits, of which about 7 million boxes, or 9 per cent., were processed. By 1949, the production had nearly doubled, with 156 million boxes. The number processed had risen nearly 10 times to about 70 million boxes or about 46 per cent. of the crop. This increase in processing has emphasised the waste disposal problem, since about 60 per cent. of the processed fruit remains as peel, rag, and seeds.

Production of frozen citrus concentrates, which increased from 225,000 gallons in 1945-46 to more than 28 million gallons in 1949-50, is likely to continue to expand.

Much of the more solid waste can be dried and used either as feed or fertiliser. A considerable quantity of citrus molasses has been recovered from the liquid wastes for use as feed. Growing of feed yeasts from the sugars in cannery wastes has been attempted and remains a field for research into better methods, and the discovery of more effective organisms. Efforts are under way to develop fermentation and filtration methods that will reduce the organic matter in the wastes to a point where sewage systems can take care of them in public disposal systems.

OVERSEAS ENQUIRIES

Baking Powder

Grell and Co., 5A, Chacon Street, Port of Spain, Trinidad, are desirous of obtaining the agency for baking powder in the islands of Barbados, Jamaica, and British Guiana, the baking powder to be packed in 10 lb. tins.

The firm is well known in the West Indies and, together with its associated companies, holds several important agencies for that territory.

Firms interested in this enquiry should communicate direct with Mr. de Montbrun at the above address.

*

Cocoa Powder

Mr. Charles Shambaugh of the Charles F. Shambaugh Company, 327, South LaSalle Street, Chicago 4, Illinois, is interested in acting in a brokerage capacity for a United Kingdom supplier of cocoa powder.

Mr. Shambaugh, who acts as a broker in such lines as sugar and cocoa powder, has had experience in this business for the past twenty years. He has informed the British Consulate General that he would accept a brokerage commission of 5 per cent., and that he would be willing to give the necessary financial information on any customer he recommends for direct shipment. He states that his accounts would buy in lots of one to twenty tons at a time. Details of the types of cocoa powder required will be given by Mr. Shambaugh to interested firms.

United Kingdom firms interested in this enquiry should communicate direct with Mr. Charles Shambaugh, giving quotations and full particulars.

Cocoa powder exported to the United States has to conform to the provisions of the United States Food, Drug, and Cosmetic Act.

*

Representation for Chocolate

G. Butler and Co., Adelaide Street, St. John's, Newfoundland, manufacturers' agents, are prepared to consider the representation of United Kingdom manufacturers of chocolates and chocolate bars. The Newfoundland firm already holds agencies for some important North American manufacturers of foodstuffs and paper products.

United Kingdom manufacturers interested in this enquiry are reminded that the Canadian authorities require that before foodstuffs are offered for sale in Canada they must comply with the provisions of the Food and Drugs Act and the Regulations made thereunder and, where applicable, other measures designed to ensure the purity of imported or domestic food products.

These provisions apply, *inter alia*, to (*a*) the product itself or the manner in which it may be prepared for sale, (*b*) the classes or descriptions of permitted colouring material, (*c*) the uses of preservatives, and (*d*) the particulars which must be shown on the labels or wrappings.

Copies of the Food and Drugs Act and Regulations and connected legislation are available for consultation at the Commercial Relations and Exports Department (Industries Branch), Board of Trade, Thames House North, Millbank, London, S.W.1.

Interested firms should communicate direct with the company, giving particulars of their products together with price lists and literature.

*

Toffee for Australia

Walter Reid and Co., General Wholesale Merchants, 262, Quay Street, Rockhampton, Queensland,

Australia, wish to get into touch with a United Kingdom manufacturer of good English toffee which will retail at 8s. per pound. They prefer the toffee to be packed in attractively decorated 1 lb. tins as this helps to increase sales.

The Australian firm would welcome offers direct by airmail from United Kingdom firms, preferably from manufacturers who are not already represented in Queensland, and are prepared to offer an agency for Central Queensland.

*

Chocolate and Sugar Confectionery

The Imperial Trade Correspondent, Port Louis, Mauritius has advised that Chue Wing, 18, Queen Street, Port Louis, would like to obtain agencies for chocolate and sugar confectionery.

The Mauritius firm, established in 1930, are general importers and wholesalers and retailers of groceries and provisions.

United Kingdom firms who are interested in this enquiry should communicate direct with Chue Wing, giving full particulars of their products with price lists and catalogues.

*

Chocolate Novelties

A. Newberg and Co., 27, East 22nd Street, New York City, desire to obtain supplies of chocolate novelties such as hollow chocolate figures, and any other confectionery lines. The company will be willing to purchase on their own account but will require to have the sole rights of sale for the commodities handled.

United Kingdom firms who are interested in this enquiry should communicate with the company, giving full particulars of the types of goods they can offer.

*

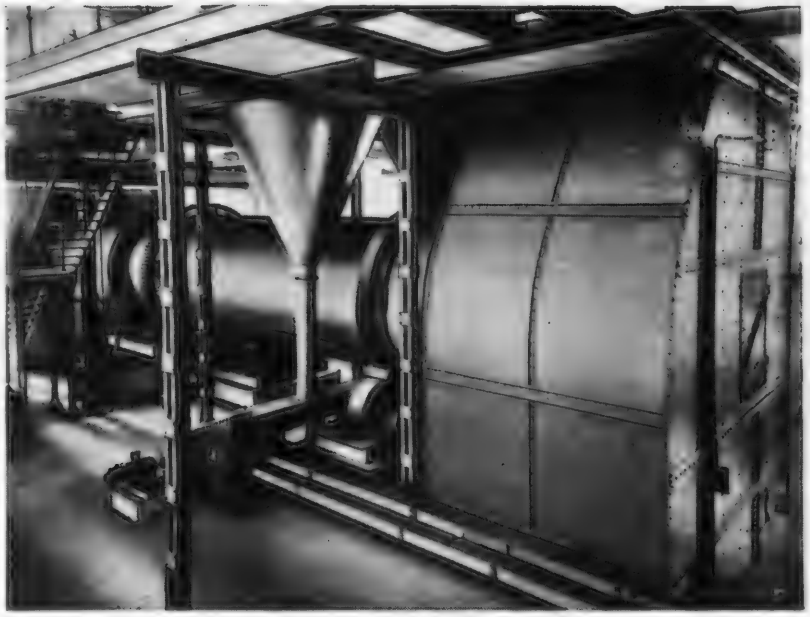
Abattoir and Butchery Equipment

The Ministry for the Colonies, Brussels, has called for tenders for the supply of all the equipment necessary for a complete abattoir and butchery to cater for the slaughtering, despatch, and distribution of 30 beasts per week, *i.e.* about 6½ tons of meat per week.

The closing date for the submission of tenders is January 11, 1952. Offers should be sent to either of the following:

1. Service des Approvisionnements du Ministère des Colonies, 14, rue des Petits Carmes, Brussels.
2. Direction Generale des Travaux Publics, Gouvernement Generale, Leopoldville, Belgian Congo.

A copy of the specification and conditions of tender (in French) is available for inspection at Room 1073, Thames House North, Millbank, London, S.W.1.



Drum drier operated by flue gases for treating beet slices.

Hungary's Sugar Beet Factory

From 1,200 to 2,500 tons of sugar beet are processed daily in some of Hungary's larger factories, yielding from 180 to 350 tons of sugar per day.

The L. Lang Machine Factory, which specialises in the manufacture of sugar refinery equipment, has worked in close collaboration with the refineries and has been instrumental in modernising the majority of Hungarian sugar plants.

There are many examples of the way in which up-to-date machinery can increase the efficiency of sugar refining. One is the development of the double, triple, and quadruple effect evaporator stations. Another is the utilisation of flue gases for the drying of beet slices. The exhausted slices provide an excellent cattle food and can be compressed to 18 to 20 per cent. dry content. By the use of a beet slice drum drier, heated with the flue gases of the boilers, about 30 to 50 per cent. of the exhausted slices, depending on the daily coal consumption of the refinery, can be dried.

Assuming a daily production of 2,000 tons, this means an output of 35 to 60 tons of dried slices. In ordinary coal-heated driers, this quantity would require 30 to 70 tons of coal daily.

Monoglycerides in Industry

Monoglycerides of the fatty acids such as stearic, oleic, lauric, and ricinoleic, and methods of manufacture are discussed in a reprint published by Glyco Products Co. The varying compositions and physical properties which are possible are outlined and a specifications chart to illustrate this is included.

Whaling by Helicopter

The Oslo newspaper *Aftenposten* has reported that the Norwegian whaling company Melsom and Melsom of Larvik have ordered a helicopter for use during the 1952-53 whaling season in the Antarctic. The helicopter is a Westland Sikorsky S-51 to be built in Britain for delivery next summer. It will be installed on board the factory ship "Norhval," and will be fitted with floats, which will enable it to take off and land on sea, ice, and deck.

Meat Symposium

A symposium on meat production, arranged by the *Centre National de Co-ordination des Etudes et Recherches sur la Nutrition et l'Alimentation*, was held in Paris from December 18-20, at which scientific research-workers and technologists presented papers on different aspects of the subject, both from the point of view of the producer and from that of the consumer.

Mechanical Engineering

The Fourth International Mechanical Engineering Congress will be held in Stockholm from June 4 to 10, 1952, when papers and discussions will be centred on improvements of materials used in engineering manufacture. This Congress is organised by the Trade Associations serving the mechanical engineering industry of twelve European countries—Belgium, Denmark, Finland, France, Western Germany, Great Britain, Italy, Netherlands, Norway, Spain, Sweden, and Switzerland.

News from the Ministries

Appointments

Mr. Nigel Fisher, M.C., M.P., has been appointed Parliamentary Private Secretary to the Minister of Food.

*

Mr. R. T. Foulds, who has been Deputy Director of the Imported Meat Division of the Ministry of Food, has been appointed Director in succession to Mr. Harold Jones, who retired at the end of last year.

Fruit in Oil Imports

Imports of fruit in oil are not now permitted from any country under Open General Licence.

Consignments of these goods will be admitted without the necessity for the production of the individual licence, which is now required, provided it is shown to the satisfaction of the Commissioners of H.M. Customs and Excise that the goods were *en route* to the United Kingdom on November 13, 1951.

Advice for the Exporter

A new publication entitled "Exporting to the United States of America" has been issued by the Board of Trade (H.M.S.O., price 2s. 6d.). Compiled with the help and advice of the Consular Department of the British Embassy in Washington, it is in no way an Economic Survey in the general sense but is rather an attempt to evaluate the more immediate and practical problems which confront the exporter.

The booklet gives a brief but comprehensive outline of the main features of the United States market, the problems connected with selling goods there, and some suggested methods of approach. Included in its seven chapters is one dealing with current United States Government Regulations which, as well as covering the main regulations of the Customs Tariff, refers to such matters as the "Buy American" Act, Consular Invoices, Marking Regulations, and the Regulations of the Food and Drug Administration. A further section gives details of the advantages which U.S. Foreign Trade Zones can offer to exporters.

Other chapters deal with the characteristics of the United States market, outlining the particular features of its main geographical regions; selling and distribution; and methods of sales promotion. Included in the last heading is advice on advertising, packaging, trade literature, and participation in exhibitions and fairs. The chapter "Entering the Market" aims particularly at giving useful advice to new and relatively smaller exporters in such matters as market research and expenditure on sales promotion. A chapter is also included on the special facilities offered by the Export Credits Guarantee Department to United Kingdom exporters to this market.

Public Health Regulations

The Sub-Committee of the Food Standards Committee is investigating the use in foods of antioxidants, anti-mould agents, solvents, and emulsifying (including stabilising, anti-staling, and foaming) agents, as well as preservatives and colouring matters. It is intended that separate reports will be prepared about each of these classes of substances.

The Sub-Committee's preliminary discussions show that further and more detailed information is required about the use, or proposed use, in foods of each of the above-mentioned classes of substances, including the purpose served by such use, and the amounts of particular substances added to foods. The Sub-Committee is anxious to have the benefit of the views of interested parties on these matters, and would welcome information, particularly on biochemical, physiological, and toxicological aspects.

Any person or organisation able to assist by the submission of such data is invited to write to the Secretary of the Sub-Committee at the offices of the Ministry of Food, Food Standards and Labelling Division, 47, Portman Square, London, W.1.

Licensing Restrictions on Imports

TRADERS' POSITION CLARIFIED

Since the coming into force of the recent import restrictions numerous importers have raised with the Board of Trade the question of the position of goods, previously admissible under Open General Licence but now subject to import licensing, in respect of which confirmed or irrevocable credits have been opened.

The Board of Trade state that import licences for the goods recently restricted are being issued on the basis of an importer's past trade in the particular goods in question. Where a licence issued to an importer on this basis is sufficient to cover the goods purchased by the importer against irrevocable credit, such goods must be a first charge against the licence.

If the licence granted to an importer on the basis of his past trade is less than the amount of confirmed or irrevocable credits outstanding on November 8, 1951, issue of an additional licence will be considered to cover the balance of the credits. The grant of licences will also be considered in the case of importers who are not entitled to a quota licence on the basis of their past trade but who can establish that the goods concerned have already been paid for, or are to be paid for, under confirmed or irrevocable credits established before November 8, 1951. In either case it may be necessary to deduct the value of the goods covered by the licence from any quota to which the importer may be entitled in the next licensing period.

If an additional licence is desired, in accordance with the above arrangement, it will be necessary for the importer to furnish the Import Licensing Branch with a statement signed by his bank giving evidence of the opening of a confirmed or irrevocable credit in favour of a beneficiary abroad and the amount outstanding under the credit on November 8, 1951. The details given should include: Form E. 2 number, date opened, period of validity of the confirmed or irrevocable credit, goods covered by the credit, name and address of the beneficiary abroad, amount of the original credit, and of the credit outstanding on November 8, 1951.

As an emergency measure, certain consignments of perishable goods which arrived in Britain prior to the issue of quota licences have been released by H.M. Customs in advance of the production of an import licence. Quota licences have now been issued for perishable goods and importers must clearly understand that no consignments of such goods arriving in future, even though they are claimed to have been paid for by irrevocable of confirmed credits, will be released by H.M. Customs without licence.

If any such goods are imported and no import licence is issued by the Board of Trade, or if the import licence issued does not cover the whole of the consignment, the goods or the portion of the consignment which is not covered by the import licence will be subject to seizure. Importers are accordingly advised in their own interest not to arrange to have goods sent forward until any necessary import licences are in their possession.

Information and Advice

Chocolate Liqueurs

B.5498. *We are interested in making liqueur chocolates and would be obliged if you could let us have a formula.* (Yorks.)

The following formula is offered as a basis for trial. The ingredients for the confection are:

Granulated sugar	16 lb.
Gum arabic mucilage	4 fl. oz.
Water	5 pints
Liqueur essence	½ fl. oz.

Half the sugar is dissolved in 2½ pints of water to form a crystal-free syrup, which is then cooled, ensuring there is no disturbance. A little water is sprinkled over the surface to prevent a crust forming.

The other 8 lb. of sugar in 2½ pints of water is cooked to 246° F. The first syrup is poured into this and stirred very carefully. The gum mucilage and flavour are added, and the solution cast in impressions in warm, dry starch. Dry starch is sifted over the surface to assist crust formation, and the trays placed in a cool place for 8-12 hours. The liqueurs are turned over with a long wire mesh scoop and allowed to stand a further 8-12 hours to form a uniform crust. They are cleaned by sieving and air brushing, laid out in crystallising tins, and crystallised in cold syrup at 34° Baumé for 12 hours. The liqueurs are then drained and placed on wire trays to dry, and finally coated with chocolate or placed as a centre in chocolate moulds of appropriate design, or used as a centre for pectin or agar jellies. To obtain a clear mucilage, gum arabic should be dissolved in its own weight of cold water. Where transparency is not essential, solution may be accelerated by the application of a little heat.

Tripe Preparation

B.5487. *Would you please supply us with methods for the preparation of tripe?* (London.)

Methods for the preparation of tripe are varied, but there is one thing common to them all. If a good colour is to be obtained, the preparation must be started as soon as possible after slaughter of the animal. After their contents have been removed, the stomachs are thoroughly washed and scrubbed with brushes, after which the excess fat is trimmed off. A rotary type washing machine is employed for the next part of the operation, the stomachs being placed in the machine with hot water at a temperature of between 136° to 140° F. with the addition of a small quantity of soda. The vanes are set in motion and their rotation removes the mucus from the lining. The addition of the soda not only assists in this, but aids the bleaching of the tripe. On removing the tripe from the machine the lining should be carefully inspected and any remaining mucus removed with a blunt knife.

Then comes the cooking, the time for which will vary with the age and the condition of the animal from which the tripe is obtained. That from old cows will never get really tender however long it is boiled, but it is found that on an average three hours should be enough. As a rough guide, if the heavy seams in the tripe can be penetrated easily by the finger, the tripe may be assumed to have been sufficiently cooked.

The tripe is then transferred to a vessel of cold running water until it has been thoroughly chilled, and, if necessary, trimmed once more.

To produce tripe in small quantities, the following method may be used:

The stomachs are turned inside out and filled up with cold water, and the opening sewn up to prevent any filth getting inside and coming into contact with the outer parts. They are next cleaned thoroughly by hand in a lime bath, then in running water, and finally cooked and cooled as above described. The actual loss during the process amounts to about 50 per cent. For storing in a fresh condition the tripe should be kept under water, in which some salt has been dissolved, in order to prevent the formation of slime.

Chocolate Cups

B.5475. *Please supply us with information on the manufacture of chocolate cups.* (Northumberland.)

Chocolate cups can be made without metal moulds. A cylinder of wood, a little deeper than the actual cup required, is wrapped in a piece of cellulose film with a single twist finish (exactly like a Dolly dye). The twisted part is held in the fingers and the cylinder is dipped in tempered chocolate to the depth required. The dipped cylinder is then placed on a plaque and put in the refrigeration cabinet until set.

To free the chocolate cup, the cellulose film is unwrapped, the wooden cylinder is allowed to fall out, and, holding the cup carefully in one hand, the film is twisted until it frees itself from the chocolate. The cups can then be filled as required, a little chocolate being piped on to the surface of the filling to close the cup.

Ordinary pastry tins with cup impressions might also be used, the impressions being filled with tempered chocolate, then turned upside down to allow any surplus to drain off. The tins are then placed in the refrigerator, following which the cups are released.

Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.5414. *Chocolate couverture.* (Bombay.)
B.5417. *Chocolate vermicelli.* (Lancs.)
B.5420. *Dog biscuits.* (Bombay.)
B.5421. *Plastic buckets.* (Ireland.)
B.5422. *Tank linings.* (Australia.)
B.5424. *Monosodium glutamate.* (Lancs.)
B.5430. *Orange peel in brine.* (London.)
B.5433. *Turkish Delight.* (Ireland.)
B.5436. *Curing of hams and bacon.* (London.)
B.5438. *Labelling requirements.* (Yorks.)
B.5440. *Egg preservation.* (Ireland.)
B.5441. *Ice cream.* (East Africa.)
B.5443. *Powdered cheese flavouring.* (Leics.)
B.5444. *Salted nuts.* (Surrey.)
B.5446. *Measuring vacuum in canned goods.* (Switzerland.)
B.5447. *Apple juice.* (Salop.)
B.5448. *High frequency cooking.* (Wilts.)
B.5449. *Literature on dehydration, packing machinery, and cartons.* (Gibraltar.)
B.5450. *Preserved ginger roots, jam for diabetics, bottling of olives, filling machine, and red cabbage shredding machine.* (Mexico.)
B.5451. *Malt.* (Belgium.)
B.5452. *Electric grinding mill.* (India.)
B.5474. *Table jellies.* (Lancs.)
B.5478. *Literature on honey.* (France.)

Information Required

B.5475. *Suppliers of peach kernel cracking machine.* (London.)
B.5491. *Suppliers of concentrated chicken extract.* (London.)

Recent Patents

660,826. AUTOPACK (LONDON), LTD., LEE, G. A., SMITH, A. R., and HOPKINS, C. J.: Foil feeding means particularly for use with a wrapping machine.
660,837. STEVENS, A. H. (American Home Foods, Inc.): Decaffeinated coffee.
660,874. HOUDRY PROCESS CORPORATION: Gel manufacture.
661,050. MAATSCHAPPIJ VOOR KOLENBEWERKING STAMICARBON N.V.: Apparatus for the classification of mixtures of different particles of grain size.
661,089. SVENSKA MJOLKPRODUKTER AKTIEBOLAG: Egg substitute and method of making the same.
661,097. POWLING, W. T., POWLING, W. T. L., and DAVIS, P. S.: Methods of preparing foodstuffs for livestock and apparatus therefor.
661,113. CONTINENTAL CAN CO., INC.: Apparatus for vacuumising, gassing, and closing containers.
661,190. INTERNATIONAL MINERALS AND CHEMICAL CORPORATION: Sugar recovery process.
661,401. AMERICAN VISCOSE CORPORATION: Method of forming a food package.
661,413. LEVER BROS. AND UNILEVER, LTD.: Boxes.
661,461. RECKITT AND COLMAN, LTD., and CORRAN, J. W.: Process for treating cereal flours.
661,472. ABBEY, A. (Dow Chemical Co.): Method of rendering carbohydrate foods resistant to micro-organisms.
661,577. HOLLANDSCHE MAATSCHAPPIJ VOOR LICENTIES EN OCTROOIEN N.V.: Process for the purification of sugar refinery liquids.
661,918. MULLER, E. R., and MULLER, A.R.: Apparatus for slitting baked goods.

Abstract of Patent Specification

Food Products in Sealed Containers

The invention relates to improvements in the processing of food products in sealed cans and more particularly food products which are liquid, semi-liquid, or solids suspended in or mixed with liquid, such as soups, evaporated milk, fruits in syrup, or vegetables in brine, and also tightly packed solids having fluids in interstices of the mass, such as whole grain corn, peas, and asparagus.

One of the important factors in processing food products in sealed cans is the time consumed to transfer heat from the walls of the can to the centre thereof so that the entire food product will be uniformly heated to or near the temperature of the treating media. The quicker this can be accomplished, the better will be the quality and nutritive value of the food product. The same is true in the cooling of the product after heat treatment.

Furthermore, any shortening of the time of heat transfer to and from the centre of the can shortens the overall processing time and is of economical value, besides producing a better quality of processed food product.

According to the present invention, a method has been devised of accelerating heat transfer to or from the contents of a sealed can containing at least one liquid constituent and provided with a space permitting movement of the contents, in which the can is placed in a heat transferring medium and rotated.

The can is rapidly and continuously rotated end over end about a fixed substantially horizontal axis located externally of the can at a speed to cause the contents to exert a centrifugal force which is in magnitude a significant fraction or small multiple of the weight of the contents so that the resultant of such force and gravity acting at the centre of gravity of the contents progressively varies in amount and in direction with respect to the direction of the longitudinal axis of the can during each rotation. This creates turbulence and causes rapid circulation of the mobile contents for accelerating heat transfer.

Preferably the can is rotated at a speed at which the centrifugal force exerted by the mobile contents of the can is greater than one-half of and not more than one and a half times the gravitational force on the contents.

654,468. *Continental Can Company, Inc.*

Trade Marks

ROCDAW.—696,237. Caps made of plastics for bottles. **Sutalite, Limited,** 12, Great Portland Street, London, W.1; Manufacturers.
PENCOB.—696,767. Flour. **Frederick Michael,** Railway Stores, Station Square, Pwllheli, Caernarvonshire; Merchant.
CALYPSO.—696,835. Chocolates and sugar confectionery, none being medicated. **R. S. Murray and Company, Limited,** Portsoken House, 155/157, Minories, London, E.C.3; Manufacturers and Merchants.
CHUNNER.—696,838. Dried and cooked vegetables. **Frederick William Maurice Power,** 61, Hillier Road, London, S.W.11; Merchant.
BUJJERS.—696,839. Articles of food made from cooked vegetable flour with or without curry. **Frederick William Maurice Power,** 61, Hillier Road, London, S.W.11; Merchant.
MICKEYPOPS.—697,105. Frozen confections. **Freezy, Limited,** 11, John Penn Street, Lewisham, London, S.E.13; Manufacturers.
COLDCROPS.—697,339. Ice cream and water ices (for food). **Coldcrops, Limited,** 23, Nork Way, Banstead, Surrey; Manufacturers and Merchants.
CAFFLAIVE.—700,346. Coffee flavouring for food and for beverages. **J. Lyons and Company, Limited,** Cadby Hall, London, W.14; Merchants and Manufacturers.
KRAFT FOODS.—700,531. Cheese, substances used as food consisting mainly of cheese, welsh rarebit, salad cream, mayonnaise, horseradish cream, and sandwich spread, made principally from gherkins. **Kraft Foods, Limited,** Silverdale Road, Hayes, Middlesex; Manufacturers and Merchants.
HAXO.—700,629. Condiments (other than condiments for cattle). **Edward Hack, Limited,** Lion House, Red Lion Street, London, W.C.1; Merchants.
SWEET NELL.—692,459. Marmalade and jam. **Crosbie's Pure Food Company, Limited,** Fruit Farms, Bradley, Lincolnshire; Manufacturers.

Recent patents and trade marks have been selected from the "Official Journal of Patents" and the "Official Trade Marks Journal" and are published by permission of the Controller of H.M.S.O.

CORRECTION

POLKA.—695,609. We are informed by Rutzou, Limited, that the application for this registration has been withdrawn.

New Companies

H. J. Hutchinson, Limited. (499957.) Wigmores North, Welwyn Garden City, Herts. To carry on business of plant bakers, makers of and dealers in bread, cakes, etc. Nom. cap.: £5,000 in £1 shares. Dirs.: J. F. Eccles, O.B.E., A.C.A., The Gables, Red Road, Boreham Wood, Herts; G. A. Floyd, 20, Attimore Close, Welwyn Garden City, Herts; C. E. Lumb, Ballard Coombe, Coombe Warren, Kingston, Surrey; G. E. Maughan; and R. C. Simmons.

Bates and Heyworth, Limited. (499990.) 59, Gisburn Road, Barnoldswick, Lancs. To carry on business of bakers, etc. Nom. cap.: £5,000 in £1 shares (2,000 cum. pref.). Dirs.: W. W. Bates and Mrs. E. C. Bates, Clifton Café, Cliviger, nr. Burnley; J. R. W. Heyworth and Mrs. E. Heyworth, The Grange, Edenfield, Ramsbottom, Lancs.

G. Llewellin and Son, Limited. (500021.) Churn Works, Haverfordwest. To carry on business of manufacturers of and dealers in refrigerators, refrigerating plant, etc. Nom. cap.: £100 in £1 shares. Dirs.: A. J. B. Llewellin, Glenover, Haverfordwest; G. H. M. Llewellin, Red Hill, Haverfordwest.

S.F.P. (Food Products), Limited. (500153.) 22a, College Hill, Cannon Street, E.C.4. Nom. cap.: £1,000 in £1 shares. Dirs.: G. Cambitzi, 19, Chesham Street, S.W.1; N. Marangos, 3, Grosvenor Square, W.1; N. G. Papassotiriou and J. A. Marangos.

Summerstrand (Refrigeration), Limited. (500192.) Offices of Keeling and Co., Crown Chambers, 118, Chancery Lane, W.C.2. Nom. cap.: £5,000 in £1 shares. Permt. director and chairman: P. J. J. Macy, 1, 6th Avenue, Summerstrand, Port Elizabeth, South Africa.

New Vita Biscuit Company, Limited. (500230.) 63/4, New Broad Street, E.C.2. To take over business carried on as "New Vita Biscuit Co." at 3a, Katherine Road, E.6. Nom. cap.: £3,000 in £1 shares. Dirs.: C. C. Petti, 52, Woodhill Crescent, Kenton, Middx.; Carmen Fuschillo, 146, Studley Road, Forest Gate, E.7; G. Parietti and J. A. T. Manser.

Cornfield Phipps and Company, Limited. (500959.) 329, High Holborn, W.C.1. To carry on business of distributors, importers, and exporters of and dealers in foodstuffs of all kinds, spices, wines and spirits, essential oils, drugs, chemicals, etc. Nom. cap.: £500 in 5s. shares. Dirs.: L. Cornfield Phipps, 1, Cyncoed Avenue, Cardiff (permt.); H. C. Andrews, 7, Grosvenor Avenue, North Harrow; R. H. Snell, 22, Manor Way, Cardiff.

E. J. Bishopp, Limited. (501025.) Alban House, St. Peters Street, St. Albans. To carry on business of buyers and sellers of meat, etc. Nom. cap.: £2,000 in £1 shares. Dirs.: E. J. Bishopp, address not stated; H. E. Cook, Wanswell, Napsbury Lane, St. Albans; Eva Mart, 53, Station Road, Harpenden, Herts.

Spred Kap, Limited. (501179.) Coventry House, South Place, E.C.2. To carry on business of manufacturers of and dealers in boxes, cartons, paper and Cellophane bags, flasks, stoppers, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: L. H. E. Lethaby, Home Farm, Ivychurch, Kent; Corin B. Hardcastle, Peveril, Green Lane, Northwood, Mddx.

From Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.

ADVERTISEMENTS that make board-rooms ring with laughter are not always good advertisements. But humorous advertising, for the right product and with the right selling theme, can bring results. One or two of our clients have figures to prove it.

Do not imagine, however, that our creative people are a troupe of clowns. At Graham & Gillies we take ourselves quite seriously. If you are interested in sound advertising that could not be mistaken for anyone else's, get in touch with us.

HUMOUR

NATURALLY we are pleased when people describe our Dubonnet advertising as 'clever.' But we are far more pleased with the way it sells Dubonnet to the drinking-classes.

HUMANITY

IT WAS A FAIR BET that chocolate-eaters would respond to a Private Likes of the Stars campaign. And it paid off handsomely in increased sales of Duncan's Chocolates.

GRAHAM & GILLIES LTD., 37 GOLDEN SQUARE, LONDON, W.1. TELEPHONE GERRARD 9121

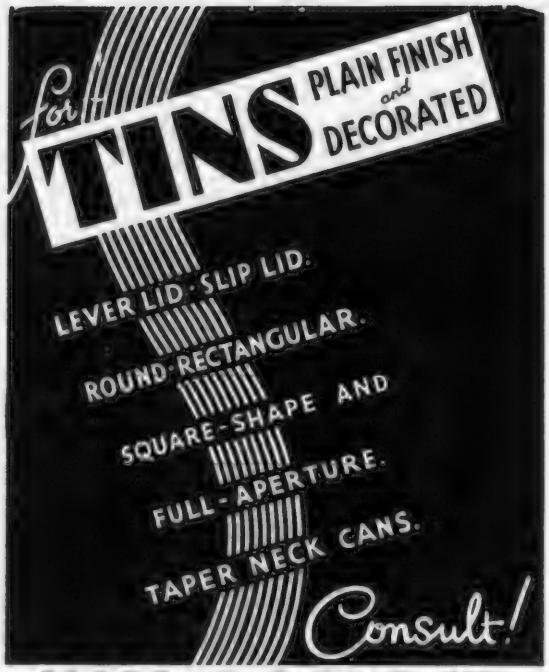
WORK WANTED

Being occupied in Summer Seasonal activities, we have available in the Winter months female staff and accommodation to undertake filling, packing or similar of Manufacturers' goods. All-the-year-round storage can also be provided

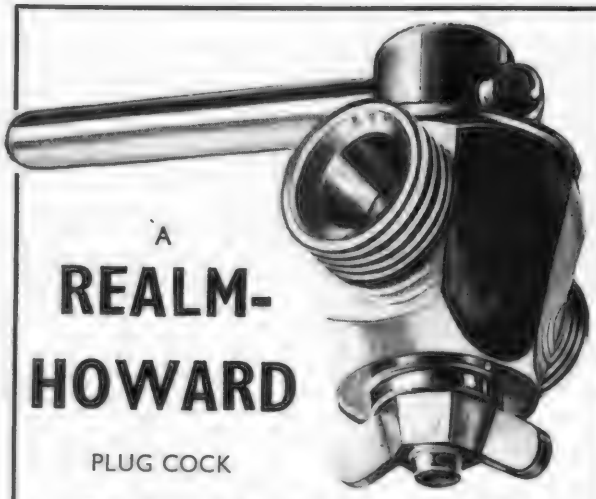
Enquiries to:

RHYL AMUSEMENTS LTD
MARINE LAKE
RHYL

Telephone: Rhyl 104



HALL & LANE LTD
DARWIN WORKS · LEOPOLD ST., BIRMINGHAM, 12
'GRAMS' TICKETING BIRMINGHAM" · 'PHONE: VICTORIA 2515 · 6 · 7



A
REALM-HOWARD
PLUG COCK

The demand for this and many other Realm-Howard Stainless Steel Pipe Fittings continues, but despite present-day difficulties, we welcome enquiries from our customers old and new.
Fully illustrated catalogue and prices on request.

THE REALM ENGINEERING WORKS LTD.
267 WHITEHORSE LANE, SOUTH NORWOOD, S.E.25

Telephone: LIVingstone 1087/88

MAXIMUM EFFICIENCY AT LOWEST COST

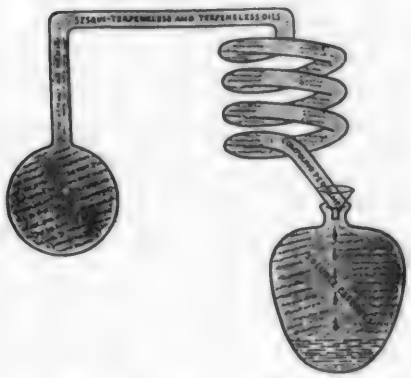
Produced for efficiency with low capital outlay for heat sealing moisture-proof transparent wrappings. Polythene, "Pliofilm," and "Cellophane." SEAL BREAKING STRENGTH APPROVED BY MINISTRY OF SUPPLY.

Accredited converters of Polythene for H.M. Services Contracts—also bag-making capacity available to all trades from HYPAK Polythene.

AGENT: F. D. Weller Ltd., London, Manchester and Dublin.

Full details on request to

The **RIVAL PACKAGING** DIVISION
of THE OPPENHEIMER CASING CO. (U.K.) LIMITED
HYPAK HOUSE
159-165 Harrow Road, Paddington, London, W.2.
Tel.: PADdington 7431/5
Scottish Sales Depot: Thornybank, Fountainbridge, Edinburgh 3
Also: Edinburgh 26652
P.O.Box1713, Wellington, NewZealand, & Union House, George St., Sydney, Australia



STANDARD SYNTHETICS LTD.

DISTILLERS OF ESSENTIAL OILS AND ESSENCES.
SPECIALISTS IN TERPENELESS LEMON ORANGE AND LIMES

LEMON OIL
CASSIA OIL AND
PEPPERMINT OIL

•

STANDARD SYNTHETICS LTD.
76 GLENTHAM ROAD
BARNES, LONDON, S.W.13

Telephone: RIVerside 3616 and 3617

Managing Director: JOHN LESLIE HINDLE, B.Sc.

WATTEN the name of high speed turbulence does it so thoroughly?

Leading manufacturers have proved that the high-speed turbulence set up by the Watten mixer produces a smooth even mix of absolutely uniform character—and does it more quickly and more economically than was deemed possible.

May we demonstrate these claims on your premises and on your individual problems. Write or phone:

Sole manufacturers and Patentee's

WATTEN EMULSIFYING MACHINES LTD

55 Wandle Road · Trinity Road · London S.W.17
Telephone Balham 7076

OVER THE COUNTER SALES.

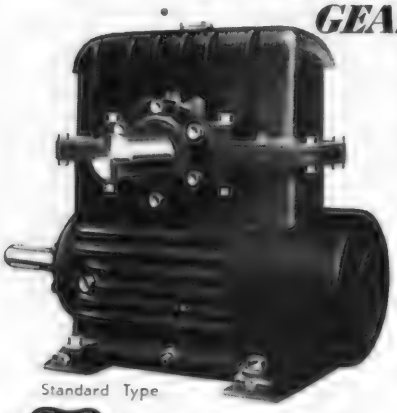
CROFTS BRADFORD 65251 EXTENSION 555

CROFTS RADIATION

Write for Folders 5016/14

Fan Cooled & Rib Cooled

WORM REDUCING GEARS



Standard Type

Standard, Inverted and Vertical types.

Horse Powers from fractional up to 400 h.p.

Gear Ratios up to 100 to 1.

Output speeds from 2.5 to 300 R.P.M.

Other ratios supplied to meet requirements.

DELIVERY FROM STOCK

UP TO 7½" CENTRES

RATIOS BETWEEN 10 TO 1 AND 60 TO 1

LARGER SIZES AT SHORT NOTICE

CROFTS (ENGINEERS) LTD., BRADFORD.

'Phone: 65251 (10 lines) 'Grams "Crofters, Bradford"

PERMOGLAZE YOUR WALLS

Permoglaze is the ideal coating for walls, woodwork and plant in food factories and wherever brightness and cleanliness are desired.

Easily applied, Permoglaze sets with a hard, glazed surface which is easy to keep clean. Its tile-like finish withstands steam, condensation, washing and hard wear.

Supplied in Gloss, Eggshell and Matt Finishes.

—— *Write for booklet* FO208 ——

Sole makers

GLAZEBROOKS LTD · Tyseley · BIRMINGHAM 11

All colours for foodstuffs

TARTRAZOL YELLOW

(Synonymous with Tartrazine)

Probably the most widely used of all foodstuff colours and prominent in our extensive range. The quality manufactured by us is unsurpassed for purity and is, of course, fully guaranteed to be in strict conformity with the Food Laws of this country. It is also on the 'permitted list' of most other countries in the world.

The above is only one of our many specialities and we invite you to send us your enquiries for all foodstuff colours. If you have any colour problems confronting you we shall be most happy to assist you.

Williams HOUNSLOW Ltd

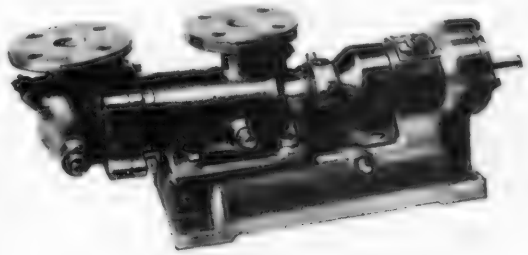
MANUFACTURERS OF GUARANTEED COLOURS FOR FOODSTUFFS SINCE 1877

HOUNSLOW · MIDDLESEX

Semi-Solidity

Semi-solid masses such as this, an apple pulp, could pose many a problem to the engineer responsible for factory layout and mechanical handling — were it not for the Mono Pump.

The powerful suction of the Mono Pump with its uniform velocity of flow enables it to deal efficiently with inert materials. Fruit pulp, yeast, fish paste, sausage meat, mud pack, thick grease and ointments are some of the normal applications of the Mono Pump.



The MONO pump

MONO PUMPS LIMITED

MONO HOUSE, 67 CLERKENWELL ROAD, LONDON, E.C.1.

Tel.: Holborn 3712 (6 lines) Cables: Monopumps, London Code: A.B.C. 7th Edition

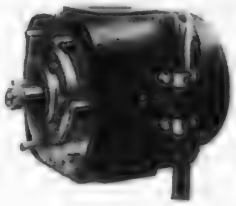
Branches at Birmingham, Dublin, Glasgow, Newcastle.

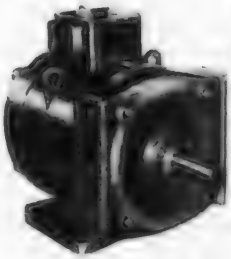
MP181dm

SEM

PRECISION BUILT ELECTRIC MOTORS

With a background of more than 35 years' experience in the manufacture of small electric motors and generators, we offer to the engineering industry the S.E.M range of single-phase capacitor start motors, 3-phase standard and high torque motors, textile loom motors, and traction motors with control gear for incorporation in battery operated electric vehicles.





Our designers and representatives are available to offer expert advice on problems involving the use of electric motors and control gear for special applications. *May we send our catalogue?*

SMALL ELECTRIC MOTORS LTD

BECKENHAM · KENT

Phone : Beckenham 0066 & 1152

Manufacturers of Control Gear, Transformers, Switchgear, etc. Contractors to all Government Departments.

ELIMINATE SPILLAGE OF BAGGED MATERIALS

easily and cheaply with Speedfix.

Spillage destroys goodwill with retailer and consumer alike. Eliminate the risk with quick-sealing

SPEEDFIX

The Tape that always grips

Printed to your own design, or in transparent or plain colours. Speedfix conforms to C.C.I. (MOS) and A.I.D. specifications. Write or 'phone (EUS. 3718) for free sample.

INDUSTRIAL TAPES LTD

SPEEDFIX HOUSE, DUKE'S RD., LONDON, W.C.1

A member of the OFREX GROUP of Companies

IT/2658

Takes DUST out of INDUSTRY

SURFASTAL DUSTPROOFING SERVICE

SURFASTAL DUSTPROOFING TREATMENT is a process applied to Concrete and Granolithic floors which renders them absolutely and permanently free from Concrete Dust. Floors case-hardened by this treatment are also Waterproof and Oil and Acid resisting.

Applied only by the Manufacturers. Results fully Guaranteed.

SURFASTAL LTD.
(DUSTLESS FLOORS DIVISION)
123, BRADFORD STREET,
BIRMINGHAM, 12
Phone: VICtoria 2948
Grams: GUPWELL, Birmingham, 12

The QP "Mixmaster"

for the Heat Treatment of

ICE CREAM
and
Synthetic CREAM

Developed from the medal-winning Q.P. Heat Treatment Plant, the 'Mixmaster' represents the highest efficiency in quality Ice Cream production.

Only requires connecting to the necessary mains services. Send for details of this all-in-one machine.

Write now for details and Technical Data, Prices, Etc.

Let us quote you for pipe fitting in Stainless Steel.

ORMEROD ENGINEERS LTD.
SHAWCLOUGH·ROCHDALE·ENGLAND
TELEPHONE TELEGRAMS
ROCHDALE 4414/5 • 'HOMOGENISERS' ROCHDALE

And then the æther which I made,
Claimed nearly all the æther trade
Throughout the trading nation;
And I with confidence might say,
That none before me knew the way
To do the operation.

Thus in light-hearted doggerel verse Joseph Jewell (Luke Howard's foreman and later his partner) recorded his numerous and important chemical achievements. Luke, however, was less carefree in his method of expression. Ever since 1797, when he founded the firm of Howards, he recorded in great detail and with the utmost precision every laboratory experiment and every production process. The accuracy of his methods and the extreme care with which he recorded his work and his discoveries formed the foundation of Howards' character today—manufacturers of the finest chemicals.

Safe as HOWARDS

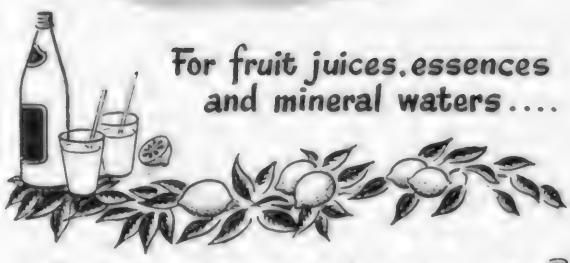
Avantine Brand of Isopropyl Alcohol
Calcium Lactate
Ether
Iodides
Lactic Acid
Magnesium Carbonate
Sodium Bicarbonate

HOWARDS & SONS LTD • ILFORD near LONDON

TSW/IC·A

Mitchell MIXERS

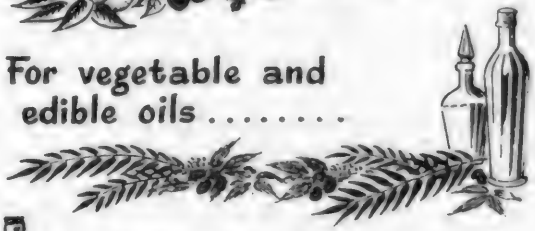
are used extensively in the foodstuffs industry



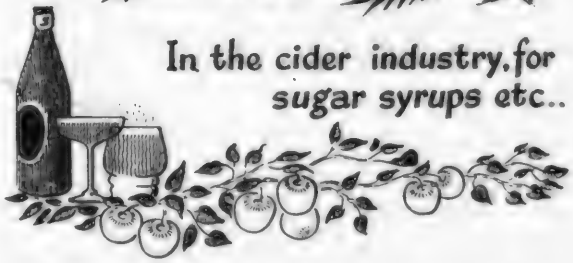
For fruit juices, essences and mineral waters....

In beer rousing and wine and spirit rousing...

In jam and marmalade manufacture...



For vegetable and edible oils.....



In the cider industry, for sugar syrups etc..

Mitchell Process Plant includes:

Mixing tanks of stainless steel, mild steel, aluminium or other metals. Acid pumps for pure foodstuffs liquors where it is desired to have freedom from metallic action. Kettles, reaction vessels and high pressure autoclaves.

L. A. MITCHELL LIMITED
37 PETER STREET MANCHESTER 2

Telephone: BLAckfriars 7224 (4 lines) MX43

From one Food Manufacturer

You can get the
CEREAL FILLER *you need from*

JOHNSONS (Darley Dale) LTD.
LADYGROVE MILLS · DARLEY DALE
DERBYSHIRE,

who make a comprehensive range of Barley, Oat & other Cereal Products, widely used in Ice-cream Mixtures, Soups, Invalid Foods & Chocolate Manufacture, etc.

Drop them a line or ring Darley Dale 202! They will deal readily with your special requirements!

to another!

★
FRUIT PULPS
★
IRISH MINCEMEAT
★
SUGAR FAT MIXTURES
★
FONDANT (ALL TYPES)
★
CHOCOLATE COUVERTURE
★
TEASEED AND OTHER EDIBLE OILS

ENQUIRIES INVITED

BARNETT TRADING COMPANY
St. Magnus House, 25 Monument St., E.C.3
Phone: MANsion House 2731-2-3-4, 1193 & 125

Rapid colour grading and sorting of liquids by

THE LOVIBOND COMPARATOR

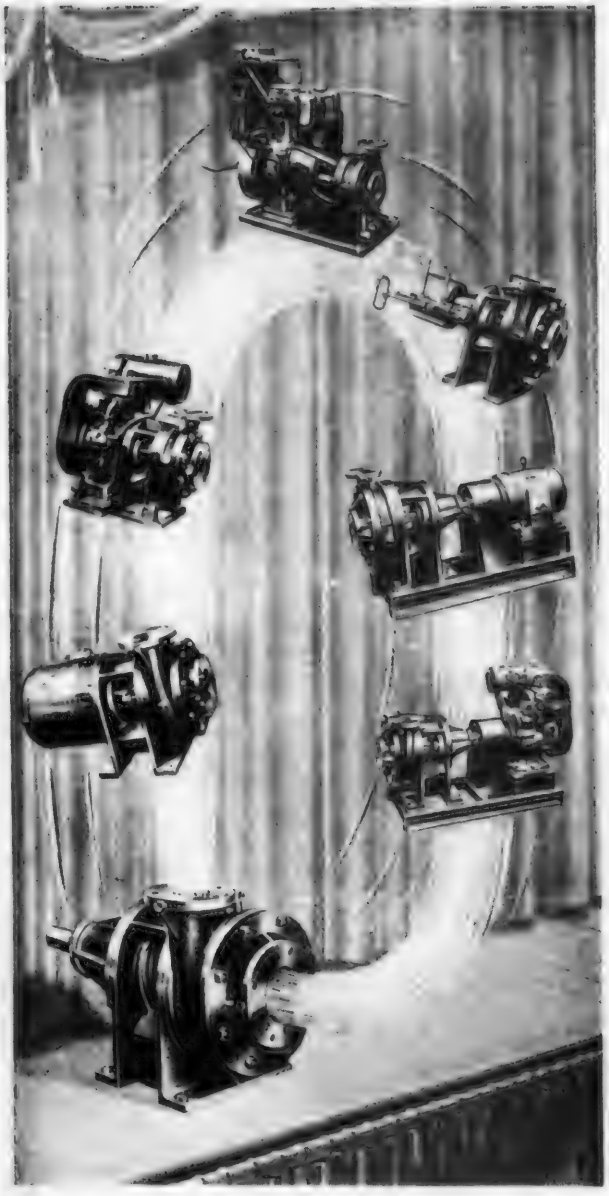
containing permanent glass colour standards made specially to match your own samples

For all aspects of colour measurement get in touch with

THE TINTOMETER LTD.
SALISBURY · ENGLAND

Glass has a CLEAR Advantage

CANNING TOWN GLASS WORKS LTD.,
30-34 NEW BRIDGE STREET, E.C.4
Telephone: CENTRAL 5342-5 *Telegrams: DRYAD, LUD, LONDON*
WORKS: CANNING TOWN, E.16 and QUEENBOROUGH, KENT



For the Best Performance in Pumping specify

ELECTRIC
PETROL
DIESEL
BELT
OR
DRIVE
THEM
HOW YOU
WILL

SAFRAN

REGISTERED TRADE MARK

CENTRIFUGAL PUMPS

8 Sizes - ¾" / 1" to 5"/6"

Duties up to 60,000 GPH
Heads up to 173 Feet

SAUNDERS VALVE CO. LTD.
CWMBRAN · NEWPORT
MONMOUTHSHIRE · ENGLAND

STERILISE WITH

DECIQUAM 222

A new approach to sterilising problems has been made possible by the advent of quaternary ammonium compounds. This has revolutionised food plant cleanliness. B.H.C., who pioneered the research work in this field, have created a product which is highly active against a wide range of micro-organisms including yeasts and moulds. Known as Deciquam 222 it renders completely sterile, without steam, all types of plant including cooking vessels, storage tanks, vats, pipe-lines, fillers and rubber hoses. Deciquam 222 used cold saves time, fuel and money. Steam can be cut off immediately before the plant has to be sterilised. This is a great advantage especially when fuel cuts are in operation.

Ask for a Technical Representative to call and discuss it with you.

TASTELESS, ODOURLESS & ABSOLUTELY HARMLESS
HIGHLY ACTIVE AGAINST A WIDE RANGE OF MICRO-ORGANISMS
NO CORROSIVE ACTION ON METAL OR OTHER SURFACES

THE BRITISH HYDROLOGICAL CORPORATION

COLLOIDAL WORKS, HIGH PATH, MERTON, S.W.19

Telephone: LIBerty 1021 (4 lines)

Associated Companies: Colloidal Detergents of Australia Ltd., Sydney, Australia: Chemical Services (Pty) Ltd., Johannesburg. And at Copenhagen, Amsterdam, Brussels, Paris, Lille, Lyons and Ober-Winterthur, Switzerland.

BHC

PHOTOGRAPH OF A HIGH GRADE DRIVE

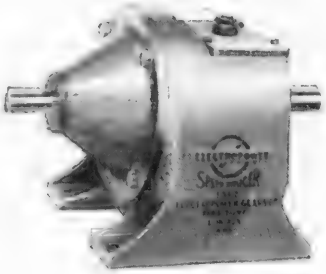
FENNER V-Belts plus Fenner precision-machined grooved pulleys complete a flexible, silent and efficient drive which requires little attention and no dressing. Stock drives available from 1/4 h.p. to 30 h.p. Belts available from 15" to 598" long.

And now speed variation (at a touch) is available from "Hainsworth" drives with Q and R Section V-Belts. Catalogue 200/1 gives full details — send for YOUR copy.

J. H. FENNER & CO. LTD.

, V-BELT DIVISION · HULL, YORKSHIRE

London · Birmingham · Manchester · Belfast · Burnley
Cardiff · Cleckheaton · Colne · Glasgow · Leeds · Liverpool
Newcastle · Nottingham · Sheffield · Stoke-on-Trent



1 10th H.P. up to 27 H.P.
Output Speed Range from
6 R.P.M. to 556 R.P.M.

A highly efficient industrial gear drive giving maximum production capacity.
Used throughout industry.

Electropower
KINGSBURY WORKS
KINGSBURY ROAD
LONDON . N.W.9

Tel.: COLindale 4621/3
Grams & Cables:
Electropowa, Hyde,
London

Trade Mark SPEED REDUCERS **Gears Ltd**

RICE FLOUR
GROUND RICE
SUPERFINE SILK DRESSED
BARLEY FLOUR

TRADE MARK

A. W. MELLISH LTD.
FREE FERRY MILLS
WOOLWICH, LONDON, S.E.18
and OLD CORN EXCHANGE, LONDON, E.C.3
Telephone: WOOLWICH 2887 (2 lines)
Telegraphic Address: WOOLWICH 2887

MODERN EQUIPMENT

"WEBSTER'S"
STAINLESS STEELWARE

ISAAC WEBSTER & SONS LTD.
ABBEY WORKS
KIRKSTALL
LEEDS, 5.

TELEPHONE 51580 LEEDS
TELEGRAMS ISAAC WEBSTER KIRKSTALL

Prevent — *by* STURTEVANT DUST EXHAUSTING SYSTEM

dust rising and dispersing from finely powdered or granular materials during handling and processing, and ensure cleaner and speedier working of the machines.

The illustration on the left shows a large hand-shaken textile filter unit handling dust from packeting and screening of food products.

Full details are contained in publication W.6505 which is now available.

STURTEVANT ENGINEERING COMPANY LIMITED

SOUTHERN HOUSE, CANNON STREET, LONDON, E.C. 4. Telephone: MANsion House 0533

BAKERS' YEASTS

DRIED YEASTS

YEAST EXTRACTS

CALCIFEROL

(VITAMIN D-2)

ERGOSTEROL

plus A WIDE RANGE OF FINE CHEMICAL & FOOD PRODUCTS

FOR MANUFACTURE AND MARKETING IN ALL PARTS OF THE WORLD

B-S POLARIMETER

Incorrodible glass circle divided to read by vernier to 0·01°.

Polariser transparent to u.v. light. Quartz fluorite objective available to replace telescope.

A full description will be sent on application to the makers:

BELLINGHAM & STANLEY LTD

71 HORNSEY RISE, LONDON, N. 19

Phone: Archway 2270

Horseradish Powder

DEHYDRATED

12×6-lb. hermetically sealed tins per wooden case

★

Mushrooms

(Boletus Edulis)

DRIED and SLICED

12×5-lb. lever-lid tins per case

★

Red Sweet Paprika

FINELY GROUND

50-kilos nett per bag

★

EXPORTER:

CENTROKOMISE LTD., PRAGUE

★

Sole Agents in Great Britain:

MINERVAL PRODUCE CO. LTD.

110 CANNON STREET, LONDON, E.C.4

Telephone: MANsion House 1046

THE

B-B VACUUM FILLER

for

CLEAN

RAPID

FILLING

of all

LIQUID

FOODS

•

SQUASHES

•

SAUCES

etc.

•

SIMPLICITY IN DESIGN AND WORKING

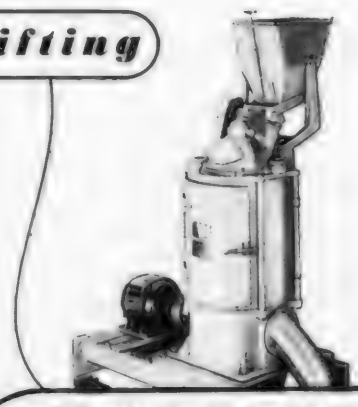
Send us your enquiries

BARKER-BLAND ENGINEERING CO. LTD.

PACKAGING ENGINEERS

60 BURY WALK, CHELSEA, LONDON, S.W.3

sifting



PASCALL

sifters have years of experience of sifting behind their design. Our experience of sifting covers a wide range of materials. Let us help you with your problem. Tests undertaken on your material and technical data supplied free of charge.

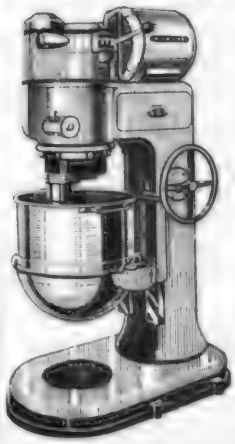
Outputs range from tons to lbs. per hour

Write for list 15 1

Tel: Paddington 7236

THE PASCALL ENGINEERING CO. LTD., 114, LISSON GROVE, LONDON, N.W.1

PEERLESS
Stands Supreme



VISIT OUR STANDS
Nos. 83, 84, 107 & 108
HOTEL RESTAURANT
AND CATERING
EXHIBITION

National Hall
Ground Floor
Olympia

For

SPEED AND EFFICIENCY

P.M. 103

The Peerless P.M. 100 Mixer is the most powerful mixer of its type in the world. The mixing action is particularly thorough and efficient due to the epicyclic sun and planet action combined with scientifically designed whisks and beaters working within bowls of special internal contour. Peerless Mixing Machines are made in various sizes from 12½ quarts capacity up to 100 quarts.

PEERLESS & ERICSSON
6, LYGON PLACE · LONDON . S.W.1
Telephone : SLOane 7291 · *Telegrams & Cables*: PEERLECTRI, SOWEST, LONDON

OFFICES AT BELFAST · BIRMINGHAM · BOURNEMOUTH · BRISTOL · CARDIFF · EDINBURGH · GLASGOW · LEEDS · MANCHESTER · NEWCASTLE · NORWICH · NOTTINGHAM

TALKING OF FLAVOUR!

Flavour must find favour—and knowing how important this is, H. E. Daniel Ltd. make essences to please and satisfy—to whet an appetite, to enthuse the consumer with the full-bodied, fresh tang of true natural flavours, and most essential too, give both you and your customer complete assurance of guaranteed purity and constant high quality.

H · E · DANIEL LTD

MANUFACTURERS, DISTILLERS & EXPORTERS OF

Fine Essences and Flavours for Food Products,
Aerated Waters and Confectionery.

ST. BERNARD WORKS, STONEY LANE, UPPER NORWOOD, LONDON, S.E.19
Telephone: LIVingstone 2287/9 Telegrams: "Hanseda" London

BALDWIN
N.P.L. MOISTURE METER

FOR A.C. MAINS

for the rapid and accurate determination of moisture in

FOODSTUFFS

including **OATMEAL, OATFEED, GROATS, BARLEY, MALT, POTATO POWDER, SPLIT PEAS, LENTILS, TEA, DRIED PEAS,** etc.,

No skill is required in use and the substance is unharmed.

MEASUREMENTS IN A FEW SECONDS

Write for detailed leaflet No. F.M. 105

BALDWIN INSTRUMENT CO. LTD
DARTFORD, KENT
Tel: Dartford 2989 & 2980

GET IN TOUCH WITH CLARESWEAR SERVICE

For 'Tailormaid' Service Wear of Supreme Quality and Style delivered ex stock.

'Clareswear' is made in our own Model Factory and every garment is designed, cut, double-seamed and fashioned individually with an intimate experience of Industrial requirements.

Remember also that every 'Clareswear' Garment is guaranteed against faulty materials and/or workmanship.

OUR 10 PAGE FASHION FOLDER
is yours for the asking free on request and it illustrates the complete Clareswear Range for Men and Women.

It is a pleasure to add, that we are now able to supply Coats and Overalls with coloured collars, cuffs and embroidered lettering if required.

CLARESWEAR SERVICE
WELLS, 14, SOMERSET
LONDON SHOWROOMS:
Africa House, Kingway, W.C.2

Gelozone

Tested and proved the most efficient of STABILISING AGENTS

1 lb. (SAMPLE) TIN 5/6 — 7 lb. TIN PER LB. 5/-
28 lb. TIN PER LB. 4/6 — 56 lb. TIN PER LB 4/3
1 cwt. TIN AND OVER, PER LB. 4/-
All prices net. Postage or carriage paid

WHIFFEN & SONS LTD.
Carnwath Road, Fulham, London, S.W.6.
Telephone: RENown 3416

FAIRFAX

FACTORY MINCER

- **Greater output.** Up to two tons hourly. Less space wanted. 7½ h.p. motor.
- **Better cutting.** Double-acting knife, hardened and ground. Steel insert in Mincer body.
- **Hygienically enclosed.** Easily cleaned. Vitreous enamelled sloping Hopper. Chromium plated hand wheel. Tinned worm and guard ring.
- **Silent working.** Multiple V-Rope drive. Special thrust ball-bearings and double seals.
- **No maintenance.**

Other **"FAIRFAX"** *products include:*
BUTCHERS' & CATERERS' MINCERS & MIXERS
SEAMLESS PANS, TRAYS & GENERAL EQUIPMENT

FAIRFAX ENGINEERING LTD.
1 REGENCY PARADE, FINCHLEY ROAD, LONDON, N.W.3
Phone: PRImrose 7646

CRODA GOOLE

OLIVE OIL

We import directly and handle only the finest edible, and pharmaceutical B.P. Oils

CRODA LIMITED

Administrative Offices CRODA HOUSE · SNAITH · GOOLE · YORKS

Phone · SNAITH 77 (three lines) ALSO AT LONDON · MANCHESTER · BRADFORD · NEW YORK

TRANSFER

MARKING MACHINES

Just what you want for printing Trade Marks, names and addresses, reference numbers, etc. Prints on any material of any shape. Saves labelling and time.

Send for full particulars.

FUNDITOR LTD

3, WOODBRIDGE ST. LONDON, E.C.I.

The Consumer of DUST

Secomak REGD

NEW MODEL 51
INDUSTRIAL
VACUUM CLEANER

Unique design makes this, weight for size, the most economical and powerful portable Vacuum Cleaner available. One man operated, it is built for easy manipulation in confined spaces.

Write for Illustrated Leaflet No. 511/50/FM

Approved by Factory Inspectors.
Universal AC/DC power unit 1,200 watts.
110 lbs. weight.
Generous size pneumatic tyres.
Large capacity internal dirt container.

SERVICE ELECTRIC Co. Ltd.
SECOMAK WORKS, HONEYPOT LANE, STANMORE, MIDDX. EDGware 8631234

IV.IQ

Since 1893
Importers and Exporters of Botanical Materials and other Raw Products employed in the Chemical, Pharmaceutical, Food, Confectionery, Perfumery Veterinary and Allied Manufacturing Trades.

Enquiries solicited for:
AGAR AGAR
CULINARY HERBS AND SEEDS
GUMS Acacia, Karaya and Tragacanth
MONOSODIUM GLUTAMATE
PAPRIKA (sweet red Pepper)
SPICES (whole and ground)
Stocks held in London and Provinces.
Correspondents in every available World Market.

H. Frischmann
62-63, FENCHURCH ST., LONDON, E.C.3
Telegrams: FRISCHMANN LONDON
Telephones: (Day) ROYAL 2211/2 (Night) SPEEDWELL 6417
CODES: LIEBER'S A.B.C. 6th & 7th, BENTLEY'S COMPLETE & 2nd PHRASE, WESTERN UNION 5 LETTER & PRIVATE

PLENTY
ROTARY PUMPS

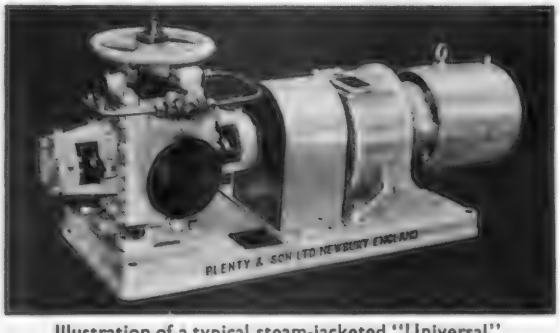


Illustration of a typical steam-jacketed "Universal" variable capacity type of unit, which efficiently pumps chocolate, syrups, fruit pulp, edible oils, margarine and cheese emulsions, paste, etc.
Can be supplied in our "General" fixed capacity type. Pump has only three main working components and can be easily dismantled for cleansing purposes.
Capacities ranging from 60 g.p.h. to 65,000 g.p.h.

PLENTY & SON LTD.
Marine Engineers & Pump Manufacturers
NEWBURY · BERKS
Telephone: NEWBURY 7 Telegrams: PLENTY, NEWBURY

STEAM, ELECTRIC AND GAS-HEATED
RETORTS
for the Canning of
MEAT
FISH
FRUIT
VEGETABLES
RENDERING OF
BONES,
etc.

"MILLWALL"

PRODUCTION BY
JOHN FRASER & SON, LTD.
ENGINEERS AND BOILER MAKERS
Specialists in plant for retorting and vacuumising
MILLWALL, LONDON, E.14 Phone: EAST 1185
(Private Branch Exchange)

RED BREAST SWEETENED FAT

Manufactured with Groundnut, Coconut or H.P.M.
Maximum Sugar Content 30%.
Packed in boxes or drums.
Special quotation for contracts.

MINCEMEAT

In boxes or barrels, to customer's formula.

RED BREAST PRESERVING CO. (Ireland) LTD.
TALLAGHT, CO. DUBLIN

LONDON OFFICE: 52 BROMPTON ROAD, S.W.3 *Phone:* Kensington 4201

A package within a package . . .

Double protection for your product—in one operation, on one machine! Pneumatic's Double Package Maker shapes a protective paper lining, then forms an outer carton around it to produce a hand-in-glove fit. The result is an exceptionally tight container which permits maximum fill . . . at "lower cost per container".

Pneumatic builds more than ninety different machines for the packaging of dry, free-flowing products, and the cleaning, filling, capping and labelling of containers for liquids and semi-liquids. Our experience and advice are at your disposal.

PNEUMATIC
PACKAGING & BOTTLING MACHINERY

PNEUMATIC SCALE CORPORATION LTD.
Home Office & Factory: **North Quincy 71, Mass.**
ENGLISH SALES AND SERVICE—
King St. Chambers, Wellington Street, Leeds 1

Gums & Resins

DAMAR·MANILA
KARAYA·ACACIA
SHELLAC·BENZOIN
TRAGACANTH

DIRECT IMPORTERS

M. HAMBURGER & SONS

Plantation House, Mincing Lane, London, E.C.3

Telephone: MANsion House 4405 (3 lines)
Telegrams: Homaclon London

1901 **BOREAS** 1951

VACUUM PUMPS & AIR COMPRESSORS

TYPES XB & YB

Air-cooled Vacuum Pumps and Compressors
Vacua up to 29½" Hg.
Press. up to 50 P.S.I.

ROTARY TYPE

Pumps and Compressors.
Vacua up to 29½" Hg.
Press. up to 30 P.S.I.

Available as machines only or complete plants.
Write to Dept. F for full particulars.

LACY-HULBERT & Co. Ltd

BOREAS WORKS · BEDDINGTON · CROYDON
PNEUMATIC ENGINEERS — ESTABLISHED 1901
TELEGRAMS: PERCHBLUE, CROYDON. TELEPHONE: CROYDON 3604/5/6

FOOD HYGIENE

USE STAINLESS STEEL EQUIPMENT IN YOUR FACTORY

ANOTHER J. & R. SPECIALITY.
MEAT PREPARATION TABLE
Size 6 ft. x 3 ft.

With inset for Cutting Board.

Stainless Steel Tables made in all sizes. Food Troughs. Mixing Bowls

J. & R. (BUTCHERS) SUPPLIES LTD.
235, NEWLAND AVENUE, HULL
Telephone: Hull 8370 Telegraphic Address: "Spices, Hull"

KEK MILLS

FOR GRINDING BLENDING EMULSIFYING ALL OVER THE WORLD

KEK LTD
PALMERSTON ST., ANCOATS, MANCHESTER 12

SINGLE-STOREY

PREMISES

(40,000 to 100,000 square feet)
WITH GOOD LOADING FACILITIES

REQUIRED

AS BOTTLING AND DISTRIBUTING CENTRES IN LONDON & HOME COUNTIES

Full particulars of suitable premises to:

CHAMBERLAIN & WILLOWS
23 MOORGATE, LONDON, E.C.2 CITY 6013

ADMUL BRAND

Emulsifiers for Food Manufacture

GLYCERYL MONOSTEARATE
GLYCERYL MONO OLEATE
GLYCERYL MONO LAURATE
AND OTHER PARTIAL FATTY ACID ESTERS

Technical enquiries welcomed—
we shall be glad to discuss your problems.

ADVITA LIMITED

2 KINGSCOTE STREET, LONDON, E.C.4

ADL 14-8

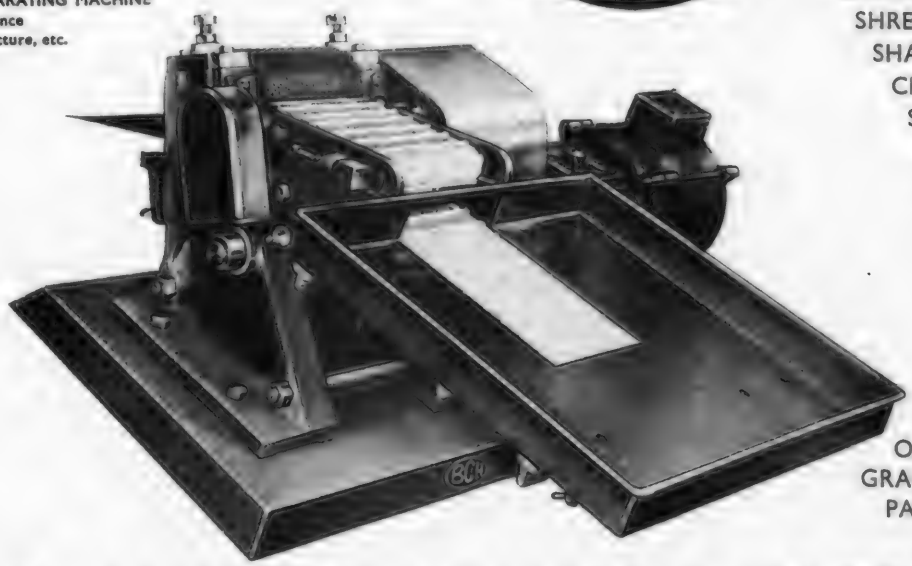
CONSULT

BCH

CITRUS FRUIT MACHINERY

HALVING
REAMING OR GOUGING
CHIPPING
SHREDDING
SHAVING OR STRIPPING
CHOPPING
SLICING
DICING
PULPING OR SIEVING
STEAMING
FILTERING
BOILING
CANDYING
SYRUPING
COOLING

PEEL SPLITTING or SEPARATING MACHINE for essence manufacture, etc.



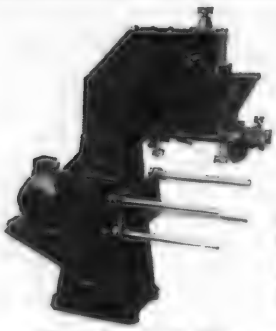
ORANGES, LEMONS, LIMES
GRAPEFRUIT, CITRON
PASSION FRUIT, etc.

WM. BRIERLEY, COLLIER & HARTLEY, LTD.

Established 1835 **BORO WORKS, ROCHDALE.** Telephone: 4181

London Office: SUNRIDGE, RUDEN WAY, EPSOM DOWNS, SURREY. Telephone: Burgh Heath 2749

Largest Jam and Confectioners' Machinists in the Trade



No. 4 – Reciprocating Type

JACKSON CROCKATT PATENT

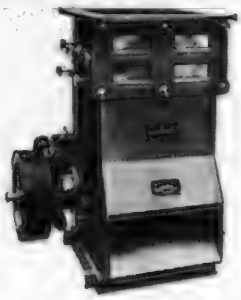
GRANULATING MACHINES

FOR DAMP AND STICKY MATERIALS PRIOR TO TABLETING

Stainless Steel · Easily Cleaned
Large Output · Durable · Motor Driven.

FOR DRY AND FRIABLE MATERIALS RUSKS, BISCUITS, FISH DRESSING, CHEMICALS, ETC.

Fines Negligible · Lumps Reduced to Granules in one Operation.



No. 2—Motor-Driven Type

J. G. JACKSON & CROCKATT LTD · NITSHILL ROAD · THORNLIEBANK · GLASGOW

Telephone : Giffnock 391

Telegrams : "JAKCRO, Thornliebank"

CONWAY JACKSON & CO. LTD.

The Food Machinery Specialists

ALL CLASSES OF **NEW** AND RECONDITIONED

FOOD MANUFACTURING EQUIPMENT

KNIVES, PLATES & REPLACEMENT PARTS FOR ALL MAKES OF MACHINES

4-6 FERDINAND PLACE, CHALK FARM, LONDON, N.W.1

Telephone: GULliver 3466

CAKE DRUMS AND BOARDS

WE ARE STILL MANUFACTURING THE

BEST QUALITY DRUM

Enquiries invited from the Trade and Export only

"NEWBRON"

Dept. F., Branch Place, Southgate Road, London, N.1

FULLER HORSEY
SONS & CASSELL

Specialists in the Sale & Valuation of

FOOD MANUFACTURING PLANTS OF EVERY DESCRIPTION

Since 1807

10 BILLITER SQUARE · LONDON · E.C.3

Telephone ROYAL 4861

Rathbone 1248

TECHNICAL BOOKS

Scientific and Technical Books supplied from stock. Foreign Books not in stock obtained under Board of Trade Licence.

Catalogues available on application. *State interests.*

SCIENTIFIC AND TECHNICAL

LENDING LIBRARY

Annual Subscription from 25s.
Details of terms and prospectus free on request.

H. K. LEWIS & Co. Ltd.

136 GOWER STREET, LONDON, W.C.1

Telephone : EUSton 4282 (7 lines)

ADHESIVES

for all types of packaging by hand or machine supplied in liquid or powder form.
Samples and advice willingly sent on application.

ADHESIVES FOR THE CANNING INDUSTRY A SPECIALITY. *EXPORT ENQUIRIES INVITED*

GLOY & EMPIRE ADHESIVES LTD. ACME WORKS CLAPTON LONDON, E.5

TELEPHONE : AMHerst 4746 (4 lines)

GLEMCO WORKS, LOUVAIN ST., FAILSWORTH, MANCHESTER. *Telephone: Failsworth 1913*
AUSTRALIA: MESSRS. J. DAVIES & SONS, LTD., 743 NORTH RD., MURRUMBENA, S.E.9, VICTORIA.
SOUTH AFRICA: ROWLAND CHUTE & CO. LTD. 430 C.T.C. BUILDINGS, PLEIN STREET, CAPE TOWN.

"RED BALL BRAND"

Essences Colours

For the Soft Drinks Industry, Confectionery and the Food Manufacturing Industries

STEVENSON & HOWELL LIMITED

STANDARD WORKS, SOUTHWARK STREET, LONDON, S.E. 1

Telephone: Waterloo 4833 (8 lines). *Established 1882.* *Telegrams: "Distiller, Phone, London."*

TWINLINK

REGD. TRADE MARK.

is like the flavour of butter made from the milk of a first-class herd of cows, and is the foremost

BUTTER FLAVOUR-AROMA

Guaranteed consistent and imparts that desirable butter flavour to all Foodstuffs. Post-card brings samples and recipes.

CUMMING, PARSONS LTD

ST. MARY'S DISTILLERY, COLLYHURST, MANCHESTER, 9

Tel.: Collyhurst 2404 and 2988 *Distillers of Fine Essences for all purposes.* Telegrams: "DISTIL, Manchester"

DEPOTS IN LONDON AND GLASGOW

AVAILABLE THROUGH ALL WHOLESALERS

HAWKER & CO.

120 PENTONVILLE ROAD, LONDON, N.1
Phone: TER. 4588

for all types of Plain Tin Containers

FIRE!

WHERE'S YOUR

NU-SWIFT?

The World's Fastest Fire Extinguishers
—for every Fire Risk

Pressure-operated by sealed CO_2 Charges

NU-SWIFT LTD · ELLAND · YORKS

In Every Ship of the Royal Navy

E.W.G.

EASTERN WOOL GROWERS
LIMITED

HADLEIGH ROAD · **IPSWICH** · SUFFOLK

Warehousing & Distribution in the Eastern Counties

Particulars: THE MANAGER, EASTERN WOOL GROWERS LIMITED, HADLEIGH ROAD, IPSWICH, SUFFOLK. *Telephone:* 3072

OPPORTUNITY IN ABERDEEN

for first-class sausage maker and under Manager to build up cooked meat trade and capable of handling all small goods, pies and some canning and be prepared to assist in building-up canning industry. Only qualified men should apply sending their complete qualifications, salary required, immediately. For right man willing to change position immediately, accommodation is available. Write in confidence to Secretary, Box B3773.

AND

DRUMS

BOUGHT, SOLD and REPAIRED

WILLIAM RYAN & CO.

TEMPLE MILL LANE · STRATFORD · E.15

(Coopers since 1848)

P P P

PURE POWDERED PECTIN

APPLE CITRUS

PERFECT FOR GEL STRENGTH AND PURITY OF COLOUR

UNIPECTIN LIMITED

12, DUKE STREET, ST. JAMES'S
LONDON, S.W.1

Telephone: Whitehall 6988/9 *Telegrams:* Unipec, Piccy, London

USE Sichel ONCE ...and you'll stick to it!

The many qualities in various forms of **SICHEL ADHESIVES** provide a completely satisfactory answer to every modern packaging problem. Should you need a liquid or powder adhesive—or waterproof glue—write to **SICHEL.** We'll give our best service and advice to all enquiries.

SICHEL ADHESIVES LTD

ESTABLISHED OVER 25 YEARS

RIVERSIDE WORKS, 6 FRIARS LANE, RICHMOND, SURREY. Phone: RICHMOND 4044

L.D.I 458

SITUATIONS VACANT

HIGH level Sales Representative required by well-known company. Applicants should have proved sales ability, and preferably some experience in selling to the Food Manufacturing trade. Some technical background would be an advantage, but the main requirements are integrity, energy, initiative and personality. Salary £900 per annum.—Write Box 766, Arthur S. Dixon Ltd., 229-231 High Holborn, London, W.C. 1.

WANTED, Production Manager for Food Preserving Works in north-east of Scotland coastal town. Previous experience in, and sound knowledge of, canning essential. Good remuneration available for suitable applicant. —Reply to Maconochie Foods Ltd., Kinnaird Head Works, Fraserburgh. All replies treated confidentially.

BOROUGH Polytechnic, Borough Road, S.E. 1. Department of Food Technology: The Governors invite applications from suitably qualified candidates for appointment as a Lecturer to teach chemistry, biology and general science to students of foodstuffs. Preference will be given to candidates who possess a degree and have had some teaching experience. The post is classified as a Grade A Assistantship under the Burnham (Further Education) Report, 1951, and salary will be payable in accordance with the Grade A scale. The basic salary will be supplemented by the appropriate London Allowances. Further particulars and forms of application may be obtained by sending a stamped addressed foolscap envelope to the undersigned: Douglas H. Ingall, Principal.

NEW ZEALAND, Bacteriologist or Microbiologist for Dominion Laboratory. Applications are invited from persons having received suitable academic qualifications and a good knowledge of food bacteriology, microbiology and bio-chemistry for appointment as: Bacteriologist or Microbiologist in the Dominion Laboratory, Department of Scientific and Industrial Research, Wellington. Salary £700 N.Z. per annum to £1,200 N.Z. per annum, according to qualifications and experience. Duties will include research into bacteriological problems associated with Meat Research and also the supervision of bacteriological examination of waters and milk. Further information, conditions of appointment and application forms may be obtained on request from The High Commissioner for New Zealand, 415 Strand, London, W.C.2, mentioning this journal and quoting reference No. A.3/64/109. Completed applications accompanied by **copies only** of two recent testimonials should be lodged not later than January 14, 1952.

SMEDLEY'S LTD. have (*a*) Vacancies for experienced Production Managers and Assistant Managers. Substantial practical experience in the canning of English Fruit, Peas and Vegetables necessary. Vacancies (*b*) also exist for a limited number of trainees, with a view to substantial positions in management after training. Candidates for (*a*) should apply to W. V. Smedley, 113, Wardour Street, London, giving clear details of experience, career, and salary required. Candidates for (*b*) should state qualifications, if any, academic degrees, or other specialised knowledge (age limit 20 to 30).

BUYING Office Executive to deal with commodity buying, stock control, etc., required by large Manufacturers and Distributors to the Baking Trade. Reply giving details of past experience, age, salary desired, etc. to The General Manager, Ch. Goldrei, Foucard and Son, Ltd., 63/69, Llewellyn Street, London, S.E.16.

QUALIFIED Chemist experienced in production and analysis of animal feeding stuffs required for work in connexion with old established company. Laboratories in London area. Salary commensurate with qualifications and experience but not less than £700 per annum.—Apply to Box B3797, giving full details of previous career.

EXPERIENCED Technician required to supervise the canning of fruits and vegetables in Central India. All round practical experience of canning essential. Contract for five years offered. Write stating experience, age and salary required.—Box B3798.

CLASSIFIED ADVERTISEMENTS

In FOOD MANUFACTURE

MUST BE PREPAID

4d. a word, minimum 6s.

Box numbers, 1s. extra.

Replies to

BOX NUMBERS

should be addressed to

Food Manufacture, 17, Stratford Place, W.1

SITUATIONS VACANT

ICE Cream: Production Manager for factory, Scotland, must be fully experienced all branches of the trade, and conversant with the most up-to-date machinery. Apply in confidence, giving age, full details experience, and copies references. Good salary to competent man.—Box B3802.

TWO energetic, keen Foremen required with experience in Mechanical Filling and Packaging of food products. Applicants must have considerable experience in handling female labour and be able to maintain a high standard of line efficiency. The company is well known for quality packs. Apply, in confidence, with full details, experience and salary required, to Box B3807.

REQUIRED by long-established firm of well-known food manufacturers in Scotland, Manager to take charge of their packing department. Applicants should possess organising ability and have experience in control of automatic packaging machines. First-class opportunity for an individual having the necessary qualifications. Good salary offered. Pension fund in operation. State details of education, industrial experience, age and present salary.—Box B3757.

SITUATIONS WANTED

FOOD Technologist and Bacteriologist. Wide and varied experience in food canning, dairy products, etc., including quality and laboratory control, management and production. Home and abroad.—Box B3772.

CHEMIST, Graduate, wide experience beverage manufacture, alcoholic and nonalcoholic, control, development and research. Seeks position with opportunities. Adaptable, used to responsibility.—Apply Box B3785.

FOOD Canner, good background, seeks promising executive appointment with enterprising concern. First-class training and experience include meat processing, specialities, buying, costing, production and labour control.—Box M636, Strand House, London, W.C. 2.

CHEMIST, 38, University Degree, with long experience in the manufacture of food products (Bakers' Sundries, Essences, Ice Cream, Synthetic Creams, etc.) seeks executive position.—Write Box B3775.

WORKS Chemist, 29 years, B.Sc.(Hons.) standard, six years food factory experience, seeks progressive post with reputable firm. Interested in technical management or sales.—Box B3759.

DRIED VEGETABLES
DRIED HERBS
SEEDS & SPICES
GROUND PAPRIKA

•

AGRICULTURAL AND CHEMICAL PRODUCTS, LTD.
32 BISHOPSGATE, LONDON, E.C.2
Telephone: London Wall 6336 and 6337

BUSINESS OPPORTUNITIES

ONE of the largest U.S. manufacturers of processing, filling and handling equipment for the canning and freezing of fresh fruits, vegetables and kindred items, desires to appoint an agent to introduce the sale of its equipment, now being manufactured under licence in Belgium and France, in England and possibly Eire. Will consider either an individual or a firm, with already established contacts with the food processing industry.—Box B3804.

ADVERTISER with ground-floor industrial premises in N.W. London will welcome proposition for manufacture or warehousing or distributing of food lines.—Box B3788.

EIRE. First-hand importers and distributors of canned and other food lines are interested to take over export production of good quality Irish Food lines. Are prepared finance raw materials and processing. Offers treated confidentially.—B3784.

DUTCH Factory in the food preserving line wants to contact firms which cater for the B.O.A.R. or to pack or refill English products for the continental markets.—Docter Bros. Ltd., Beverwijk-Holland.

ESSENTIAL Oil importers unable to utilise in full their own import licences and willing to pass these on to actual consumers kindly write to us.—Box 3783.

FLOOR space available in Bristol at Food Manufactory of several thousand square feet for warehousing or manufacturing.—Box B3800.

MASSEELEY Stamping Machines rebuilt and guaranteed by Hill Bros. Ltd., Acton Works, Beaconsfield Road, London, W.4, also Types, Dies, Foil, Transfer Film, Acetates, Cardboard, Gummed Papers, Guillotines, etc., all at bargain prices.—Ring CHIswick 2235.

FULL steam in five minutes with B. & A. Electrode Boilers, used by British industries for 20 years. No boilerhouse, no flue, no attendant needed. The most compact and convenient steam raisers available, can go beside machines using the steam.—Write for Leaflet 125, Bastian & Allen Ltd., Ferndale Terrace, Harrow, Middx.

H. G. MAEHL & Co. Ltd., 7, Woodward Street, Wellington, New Zealand, Manufacturers' Agents, Importers, Exporters, Brokers, are open to receive offers and quotations for all types of foodstuffs including canned foods and general merchandise for distribution in New Zealand from U.K. or Europe, etc.

FYNA Mills for Finer Grinding. Industrial models from 3 h.p. to 75 h.p. Drive from electric motor or engine. Cool grinding; elevating and bagging in one operation. Guaranteed.—Enquiries to Fyna Industries Ltd., 19, Winstanley Road, S.W.11.

PULVERISING. Grinding, Mixing, Drying. We collect and deliver.—Crack Pulverising Mills Ltd., 49/51, Eastcheap, London, E.C.3. Mansion House 4406.

FOOD Manufacturer requires work done on vegetable proteins and extracts for food, synthetic creams, and industrial uses by fully qualified and experienced chemist commanding use of laboratory and facilities to carry out physical tests.—Box B3808.

N.Z.

Manufacturer domestic chemical preservative (patented) contact desires reputable firm or individual. View licensed manufacture or partnership. Large potential market. Principals write Box B3792.

WRAPPING AND CARTONING MACHINES

•

S.I.G. WRAPPING MACHINES LTD.
95 VICTORIA ST., LONDON, S.W.1
Sole Agents for Swiss Industrial Society
Invite your enquiries *Phone ABBEY 451*

PLANT FOR SALE

QUANTITY of unused Silent-sleeve Bearing Refrigerator Motors by Laurence Scott, outputs 1½ h.p., 1425 r.p.m.; 2 h.p., 1430 r.p.m.; 400/3/50.—Abelson and Co. (Engineers) Ltd., Coventry Road, Sheldon, Birmingham, 26. Tel.: Sheldon 2424.

BRAND new. Complete can and box making plant for tinned steel work. Plant comprising shears; cornering, bending, turning and forming machines; Longitudinal seaming machines; Double border forming machines; Curling machines; Presses with forming and cutting tools, etc.; Rubber ring inserting machines; and all tools and accessories.—Newman Industries Ltd., Yate, Bristol. Tel.: Chipping Sodbury 3311.

ONE 150-gall. capacity mild steel Steam-Jacketed Pan, 80 lb. working pressure. Price £110.—Box B3780.

FOR sale, One 21C Type Calorifier. 500-gall. capacity. As new. Not been installed.—Box B3779.

HARD Fat or Chocolate Shaving Machine 39 in. multiple rotary blade; Jackson Crockatt Paste Filler, motorised, 60 jars per minute; Stokes power bench single punch Tablet Machines; Duckworth 2a Dry Fruit Cleaner; twin- and four-chamber Steaming Ovens; copper and tripod Steam Jacket Pans, 40 gall. to 10 gall. size, 100 lb. steam; large size Gooseberry Snibber, motorised A.C.; open bowl Dough Kneaders ¾, 1 and 1½ sack sizes; vertical 80 qt., 40 qt., 20 qt. and 10 qt. Hobart Mixers; Marshmallow Beaters, 22 gall. size; Gravil twin head Liquid Vacuum Filler. Small selection of our stock.—E. W. Wallbridge, 136, Sefton Street, Southport. Tel.: 67968 Southport.

FOR Sale, Peerless motorised Potato Crisper, 400/3/50; Portway two- and three-tier gas-fired Portable Ovens; Esse gas-fired twin compartment Steaming Oven; Crypto electric Mincing Machine, 220/1/50; Gravity Conveyors, rollers 14 in. and 18 in. wide on 4 in. and 6 in. centres; Portable Conveyor, oak slats or flat rubber belt, 17 in. wide, 22 ft. long, adjustable delivery height 4 ft./14 ft.—Kimmins and Sons, Ltd., Lyndhurst Road, Worthing.

The Strongest Vanilla Flavour

VANOLEUM

1 oz. (2/6) makes a pint of essence
4 ozs. 8/6. ¼ lb. 16/6. 1 lb. 32/-

For further details apply:

ARTHUR WHITTAKER & CO. LTD.
30 Church St., Newton Heath, Manchester, 10

PROCESSED CHEESE PLANT. For sale, two Kestner Wrapping Machines for triangular portions, labelling machine and suitable vacuum pump, all complete with electrical accessories. Machines are in good working order and are being offered for immediate delivery at a reasonable price. Enquiries to Manager, Golden Vale Food Products Ltd., Charleville, Co. Cork, Ireland

SECOND-HAND PLANT FOR SALE

600

COMPLETE POWER INSTALLATION
(installed in 1941)

Comprising four Thompson Beta Water-tube Boilers each 50,000 lb. evap., 250 lb. working pressure, complete with Economisers, Superheaters and Chain-grate Stokers.
4,000 kW. Parson's Extraction-type Turbo Alternator, output at 11,000 volts, 3 phase, 50 cycles. Steam conditions 250 lb. per sq. in. superheated to 650°F., designed to pass out up to a maximum of 85,000 lb. of steam per hour at 65 lb. per sq. in.—or to operate straight condensing.

ANCILLARY EQUIPMENT

Wagon Side-tippler, Feed Pumps, De-aerators, Electro-Flo Meters, Piping, Valves, Staging, etc.
All housed in steel frame building.

GEORGE COHEN
SONS & CO. LTD.
SUNBEAM ROAD, LONDON N.W.10
Tel.: Elgar 7222/7
& STANNINGLEY, Nr. LEEDS
Tel.: Pudsey 2241

BUTTER Processing and Packing Plant: the following items of used machinery, etc., are for sale, and offers are invited: 6 Dreadnought Churns, 12½/15½ cwt. capacity, with motors and starters; 1 Shiving Machine, G. J. Worssam and Son, with motor and starter; 10 ½-lb. size Packing Machines, Benz and Hilgers, 110 exact; 2 ¼-lb. size Packing Machines, Benz and Hilgers, 110 exact; 2 1-lb. size Packing Machines, Benz and Hilgers, 110 exact; 1 Bulk Packing Machine, Benz and Hilgers; 3 Avery Light and Heavy Scales, weighing up to 4 lb.; three Waggons, stainless steel trough, 4 ft. 6 in. by 2 ft. 7 in. by 2 ft. 5 in., open end.—Box B3738.

Phone 98 Staines

TWO-THROW wet Vacuum Pump, 24,000 lb. p.h.; Edwards Speedivac Vacuum Pumps, type 2; steel Steam Cooking Retorts, 6 ft. by 3 ft. by 3 ft.; five-roll w.c. Refiners with 33 in. steel rolls; Alite Powder Mixer, 400 lb., and filling machine ¼ oz. to 3 lb. packets; Lard Cooling or Film Drying Rolls, 9 ft. by 4 ft. diam. Autoclaves, condensers, boilers, grinders, "Z" and find blade and jac. mixers, pumps, pans and tanks, etc.—Harry H. Gardam and Co. Ltd.

NEW and secondhand Double Seamers for Fish Cans, also Vertical Cooking Retorts, Steam Exhaust Boxes, Steam Jacketed Pans and Can Washing Machines.—Apply Bon-Accord Press Tool Co., 37, St. Clair Street, Aberdeen, Scotland.

FOR sale, two motorised stainless steel Vacuum Dryers, by Scott, 4 ft. 6 in. diam. by 8 ft. long. Capacity 1,600-1,800 lb. each. With electric motors, reduction gear, vacuum pump and condenser. On c.i. frame. As new. —Abelson and Co. (Engineers) Ltd., 70, Victoria Street, London, S.W.1. Tel.: TATe Gallery 9444.

SECOND-HAND PLANT FOR SALE

GOOD secondhand Flowers Eclipse Labelling Machine complete with motor. £125.—Box B3690.

GOOD second-hand copper jacketed Boiling Pans, copper inners, c.i. outer jacket, 60 lb. working pressure, hand tilting, £70; reconditioned all copper jacketed Pans, 100 lb. working pressure, £95.—Box B3696.

WE have the largest stock of used Can-making Machinery in the country, comprising: Body Formers, Flangers, Double Seamers and Stationary Closing Machines by the world's best makers. Send us your enquiries for small units or complete installations.—F. J. Edwards Ltd., 359, Euston Road, London, N.W.1. (Euston 4681 & 3771) Lansdowne House, 41 Water Street, Birmingham, 3. (Central 7606-7).

GAS-FIRED Brockhouse Boiler, new 1948, 300 lb. per hour, w.p. 120 lb., fully automatic, suitable food processing, laundry, etc., seen in working condition by appointment.—R. S. Bennett, Peet Street, Derby.

100 GALL. monel metal water-jacketed Pan with propellor agitator; heavy Drum Mixer, 6 ft. by 2 ft. 4 in. (inside); horizontal "U" Powder Mixer, 50 gall.; No. 1 Morton Duplex Mixer; stainless steel Tank, 12 ft. by 3 ft. 3 in. wide by 9 in. falling to 14 in. deep.—Winkworth Machinery Ltd., 65, High Street, Staines. Tel.: 1010.

BOTTLE Filling and Capping Machine: stainless steel container, 100/300 gall. per hour capacity; ½, ¼, pint and quart size bottles; cardboard caps; motor driven. Ditto, 500 gall. per hour; metal caps. View by appointment.—Winkworth Machinery Ltd., 65, High Street, Staines.

LABELLING MACHINES

Reconditioned as new

PURDY · NATIONAL
RAWSON · ERMOLD
FLOWERS · NEWMAN

Labellers always in stock

Established 1875

C. SKERMAN & SONS LTD.
118, PUTNEY BRIDGE ROAD, LONDON, S.W.15 *Tel.*: **VANDYKE 2406/7**

FRUIT PULPS

Send your enquiries to the **Producers**

THE BEDDINGTON NUT & PRODUCE CO. LTD.

HIGHLANDS HILL, SWANLEY, KENT
Telephone: Swanley Junction 2306/7
Telegraphic Address:
"Namsoluc Swanley, Dartford"

SECOND-HAND PLANT FOR SALE

GARDNER, size "G," Rapid Sifter and Mixer, 3 cwt. capacity; Young Gardner-type Rapid Sifter-Mixer, 5 cwt. capacity; 12 various Sifting and Dressing Machines, with barrels from 80 in. to 120 in. long and 18 in. to 30 in. diam., spout and worm fed, with collecting worms in the bottom, for flour, custard powders and all dry granular materials; 00, 1½, 2½ and 3½ size Disintegrators; toothed Roller Crushers or Cake Kibblers, 15 in. to 40 in. long, with one or two pairs of adjustable rolls; Hydro Extractors up to 48 in. baskets; 4 various Sterilizing Chambers; twin roller Drying Machine, Milne type; single roll Drying Machine; 2 sets Oat Crushing Rolls; 4 Baker Perkins rotary bowl Dough Kneaders; 4 Baker Perkins 5-roll Chocolate Refiners, rolls 40 in. long, water-cooled; 12 various Werner Pfleiderer and Baker Perkins Mixers, tipping type, double fin or double "Z" arms, up to 48 in. by 53 in. by 36 in. deep; 1 horizontal Soap Cooling Press; 2 new single-plunger Tableting Machines, capacity 80 aspirin-size tablets per minute; 1 horizontal Macaroni Press with gearbox and self-contained motor; 3 Platform Weigh Scales, Dormant type, various sizes. Full list upon application. Reasonable prices.—Write Richard Sizer Ltd., Cuber Works, Hull, or 21, Dale Street, Liverpool. Tel.: Hull 31743.

MISCELLANEOUS SALES

BLACKPOOL, modern Factory fully equipped for sweets, rock and chocolate products. Offices, stores, etc. Land for extension.—Handy, 17, Madison Avenue, Bispham.

MANGO Pulp (syrup) containing 65% sugar, packed in approximately 4½ cwt. casks net, prompt from stock available.—Please enquire to Box B3732.

CARTONS new and once used; large quantities available.—Gerrard Trading Company, 21, Bateman Street, London, W.1. Tel.: GERrard 1123.

UTILITY Industrial Overalls for men and women in all trades. Every colour and type of garment supplied. Also all types of Industrial Gloves and Aprons. We are Overall and Glove specialists.—H. and F. Morris Ltd., 173, Anson Road, London, N.W.2. Tel.: GLA 4696 and 0480.

EDIBLE Vegetable Oil, excellent for all frying and cooking purposes. Very competitive prices. Free testing sample.—J. J. Vigon and Co., 30, Fenchurch Street, E.C.3. Tel.: Mansion House 0466-9.

LABORATORY Test Sieves to B.S.410:43 or commercial quality, ring or write for brochure.—Endecotts (Filters) Ltd., 251, Kingston Road, London, S.W.19. Tel.: Liberty 8121/2.

MISCELLANEOUS WANTS

WASTE Foods, food residues, bulk or canned in large or small quantities required.—Send your offers to Rotunda Foods Co., London Office: 50/52, Blandford Street, W.1. Tel.: Welbeck 8465.

STONE jars, bottles, carboys, demijohns, tins, boxes, metal and bakelite caps wanted, all capacities, any district. Send fullest particulars and samples to T. Gunn (Rayleigh) Ltd., 206, London Road, Rayleigh, Essex. Tel.: Rayleigh 87.

FACTORY Premises required from 10,000 sq. ft. upwards suitable for Preserves Manufacture. Will consider purchase Preserves business as going concern.—Full details to Box B3789.

ALL kinds of waste foods purchased—bones, canned goods, etc.—Henry Quennell Ltd., Penketh, Warrington.

SALMON Manufacturer wishes to purchase canned salmon, grades 1, 2 or 3. Quote price and quantity.—Box B3776.

INDUSTRIAL CANTEEN EQUIPMENT

Delivery ex stock. Cookers, Water Boilers, Steamers, Fish Fryers, Hot Cupboards, Crockery, Cutlery, Furniture, etc.

HORWOOD CATERING EQUIPMENT LTD.
Tel.: ARCHWAY 1574/5226/5227

SECOND-HAND PLANT FOR SALE

HIGH-POWERED, large capacity, Jar Washing Machine for sale. Will handle any type Jar up to 8 in. in height. Ideal for Jam Jars, Pickle Jars, etc. Available immediately, complete with all pumps, motors, etc., at a fraction of today's value. For full details of size, capacity, price, etc., please write Box B3791.

FOR immediate sale 7 Servis Recorders in good condition.—Apply Box B3801.

REDUNDANT Machinery, hardly used, including Gilbert 2-sack Dough Mixers, Rapid Disintegrator, etc. On view Mycalex Co. Ltd., Cirencester 400.

FOR sale, one Calco Electric Automatic Weighing and Filling Machine Model K1 for nut kernels, potato crisps, etc. Weighing capacity up to 4 ozs. 25 to 30 weighings per minute. Little used. Cost £350, first offer over £150 secures.—Cartmell and Co. Ltd., Catherine Street, Whitehaven. Phone 398.

FOR sale: 1948 Electric "Alite" Loose Filling Machine. New condition, used very little. Very reasonable price. Particulars from B. T. Ltd. (Tea Merchants), 3, Latham Street, Preston, Lancs.

FAT Cooling Tunnel (for man. cooking fat in tablets) Grasso, complete with 2 cylinders Grasso Compressor with motor, condensor, conveyor belt for empty cups and soaking-apparatus capacity 600 kg. per hour; Horizontal Grasso Compressor 70.000 cal. with motor; Paddle Kneading Machine (with mechanical Removal) Grasso annex motor 25 h.p., table diameter 3.20 m.; Paddle Kneading Machine (with mechanical Removal) Grasso with motor 15 h.p., table diameter 2.00 m.; Big Boiler very suitable for nursery N.V. De Overijsselsche Deventer, Holland 15½ m² heating surface; High Pressure Boiler Muscate Betcke and Co. Schwiebers 142 lbs./sq. in., 10 m² heating surface; Triple Rolling Mill with steel rolls, Lehmann, Dresden. Length of the rolls 70 cm., diameter 40 cm.—Box B3777.

FOR disposal. One Megator pump. Type M.8. No. 414. Approx. 100 g.p.h. Driven by an A.C. 440 volt 3-phase 50-cycle ¾ h.p. motor at 1·5 amps. 1420 r.p.m. reduced to 460 r.p.m. In good condition and recently overhauled.—Dextran Ltd., Aycliffe Trading Estate, Darlington.

GARDNER Rapid Powder Sifter/Mixer, "H" size, 5 cwt. capacity, complete with 5 h.p. A.C. motor. Also, Youngs 300 lb. capacity. Perfect condition. Details from Box B3805.

BOTTLE Filling and Capping Machine. Stainless Steel container 100/300 gallons per hour capacity. ¼, ½, pint and quart size bottles. Cardboard Caps. Motor driven. View by appointment.—Winkworth Machinery Ltd., 65 High Street, Staines.

All kinds of

GELATINES

CAKE AND GROUND

ALMONDS	DES. COCONUT
BRAZILS	AGAR-AGAR
WALNUTS	GUM ARABIC
HAZELNUTS	ALBUMEN
GINGER	COCOA BUTTER
TARTARIC ACID	SAGO FLOUR
FARINA	CORNFLOUR

GLOBE 3a, the Health Glucose

T. M. DUCHÉ & SONS

(U.K.) LTD.

MANCHESTER · LONDON · GLASGOW

SECOND-HAND PLANT WANTED

WANTED, Boilers, Cochran Vertical 2,500/4,000 lb./hr. at 150 lb. w.p.; three Vacuum Dryers, 2,000 lb. capacity, extraction 40%-50%, fully motorised; two Loco Boilers, 2,500 lb. hr. capacity at 150 lb. w.p. on wheels.—Box B3735.

PEA Viner required, in good condition, output up to 25 cwt. per hour.—Box B3748.

WANTED, Compressors, 200 c.p.m. 2 stage Water cooled 100 lb. p.s.i. pressure Electric Motors, 400/3/50 supply.—Details to Box B3786.

WANTED, Vacuum Dryer, Horizontal Type suitable for foodstuffs 1800/2000 lb. capacity.—Box B3787.

WANTED, one second-hand Taber Carbonater with or without motor.—Box B3781.

REQUIRED, 2 Horizontal Retorts 6 ft. by 3 ft. by 3 ft. S.W.P. 30 lb. Will consider lower pressure.—Box B3774.

TABLE Jelly Cutting Machine urgently required, either hand or power operated. Please send details to Box B3806.

MISCELLANEOUS SALES

SMALL Cardboard Drums. Advertiser has for disposal 400 gross 3 in. by 1½ in., 300 gross 3½ in. by 1⅞ in., some sprinkler top.—Box B3790.

FREEHOLD factory completed 1951; approximately 7,200 sq. ft. floor space, plus open land of approximately 7/8,000 sq. ft.; modern steam heating system. Ideal siting near main roads, railways and docks.—Box 3782.

FOR sale, Toffee Manufacturers who are interested in extending their sugar and milk supplies.—Box 3778.

TUBULAR Steel Trucks of remarkable lightness and strength. Pneumatic tyred, roller-bearing wheels. Platform 5 ft. 4 in. by 2 ft. 9 in. carrying capacity 10 cwt. £12 12s. 6d. Immediate delivery. Catalogue on request.—The Sterling Pump Co. Ltd., Spalding. Tel.: 2404.

MARZIPAN 70% Almonds, 30% Sugar, and 50-50% limited quantities available for forward shipment.—Box B3793.

WE can offer Fruit Pulp, containing 50% sugar, Cut Mixed Peel, for prompt and forward shipment.—Box B3794.

500 tons Citrus Flavoured Sugar Syrup, also other syrups, containing large percentage of sugar, available for forward shipment.—Box B3795.

FOR sale, 15,000 gall. Clear Raspberry Juice, 60,000 gall. Blackcurrant Juice, Australian origin shipment February/April. Buyers write Box B3796.

FOR sale: Food Manufacturing Firm for disposal. Useful nucleus of customers. Sugar allocation for Sauces, Pickles and Soft Drinks. Several speciality lines supplied to large national organizations. Modern steam-heated factory. Enquiries in confidence to Box B3790.

SAUCE-SUGAR allocation 3 cwts. every two months, also quantity of Date Syrup, Spices, Carob Juice, Stoned Dates, Burnt Caramel-Colour, Acetic Acid, and 8-oz. and 5-oz. bottles.—Box 3803.

COMBINED Sifting and Mixing Machines, 3 cwt. to 2 tons capacity; Herb Rubbing Machines.—Makers D. Burr & Son Ltd., Drayton Place, Croydon.

CANDY Floss Crystals supplied. We also invite enquiries for Essences, Colours, Flavours Syrups, Concentrates and Squashes for Iced Lollies and Candy Floss, etc.—The English Orchard Co. (London), Ltd., 83-85, Evelina Road, Nunhead, S.E.15 (New Cross 0607).

MINCEMEAT

Irish Firm with additional capacity will quote for any recipe required. Strict supervision of cleaning and processing.

O'Kennedy-Brindley, Ltd. Advertising Service
53/54, Lr. O'Connell Street, Dublin

Pulsometer

Geryk VACUUM or PRESSURE PUMPS

RESEARCH WORKERS Save your high vacuum pumps for high vacuum work. Use this unit for the odd jobs.

Characteristics: 1. Portable. 2. Stands on the bench. 3. ⅛ H.P. motor with trailing lead. 4. Easy to clean and service. 5. Swept volume : 1 cu.ft/min. 6. Vacuum ·01 M/M. 7. Pressure 10 lb/per square inch.

Pulsometer Engineering Co. Ltd.,
Nine Elms Ironworks, Reading.

CARTONS
DISPLAY BOXES

AMHerst BFB 3261/4

ESTABLISHED 1888

Experience Counts !

BRITANNIA FOLDING BOX CO. LTD.
DACE ROAD . OLD FORD . LONDON

DRIED AUTOLYSED YEAST
(D.A.Y.)

Widely used by Food Manufacturers for the Preparation of

FOOD CONCENTRATES
GRAVY POWDERS
SAUSAGE FILLINGS
SAVOURY BISCUITS
SOUP POWDERS

D.A.Y. is rich in protein and imparts a characteristic flavour.

Samples and prices may be obtained from

THE DISTILLERS COMPANY LIMITED
8, 10 & 12, TORPHICHEN STREET, EDINBURGH

STAINLESS STEEL
Jam Bogie

The illustration shows a bogie with stainless steel container in mild steel cradle, which is typical of our large range of hygienic equipment specially made for food manufacture and processing.

GENERAL ENGINEERS

& AT BIRMINGHAM LIVERPOOL NEWCASTLE BELFAST & DUBLIN

Specialists in Fabricated Metal Work in
STAINLESS STEEL, MONEL METAL, COPPER

Associated Metal Works (GLASGOW) LTD.
30 ST. ANDREW'S SQUARE, GLASGOW, C.1

'Phone: BELL 2004/5 *'Grams:* "STAINLESS, GLASGOW"
LONDON: 7 GROSVENOR GDNS., S.W.1
'Phone: VICTORIA 1977/8

The foresight of the packers in fitting R.O. Seals bears dividends in increased customer satisfaction. This point-of-sale factor is vital to *your* product too. If you use ordinary screw-thread closures, ask yourself these questions—Am I getting 100% hermetic sealing?—Does the closure cause trouble due to variations in the thread of bottles? The R.O. Seal avoids all this by a system of application which literally *rolls on* the cap so that each bottle or jar is individually fitted and hermetically sealed—automatically!
Presentation-conscious manufacturers are getting to know that the R.O. Seal means factory-fresh products in the shops, no returns of leaking bottles from disgusted dealers and a more colourful, attractive closure into the bargain. Why not send for samples and free descriptive brochure?

THE **R.O. seal** *the made-to-measure closure for factory-fresh sealing*

PLAIN OR PILFERPROOF

METAL CLOSURES LTD · WEST BROMWICH · STAFFS.

LONDON OFFICE: 40 BROOK ST., W.1

If many years ago we started something, we apologise. Now in an era of abbreviated nomenclature

USE GOOD BOTTLES

Initials that mean something to packers

UNITED GLASS BOTTLE MANUFACTURERS LTD

8 LEICESTER ST. W.C.2 · *Telephone:* **GERRARD 8611 (18 Lines)** *Telegrams:* **UNGLABOMAN, LESQUARE, LONDON**

Printed for the Proprietors, LEONARD HILL LIMITED, and published by them at their Offices, 17, Stratford Place, London, W.1
by Billing and Sons Ltd., The London Printing Works, Guildford and Esher, England
Registered for Transmission to Canada including Newfoundland